STEEL

The Metalworking Weekly

JUNE 6, 1960

A PENTON PUBLICATION

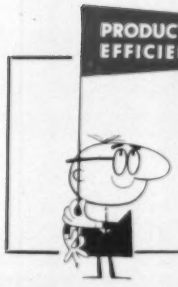
1960 Bargaining: Metalworkers Gain on Management Rights Issues

Can Electron Beam Melting Compete?

Rail Steel Holds at 1959 Pace

Clad Metalmakers Seek New Markets

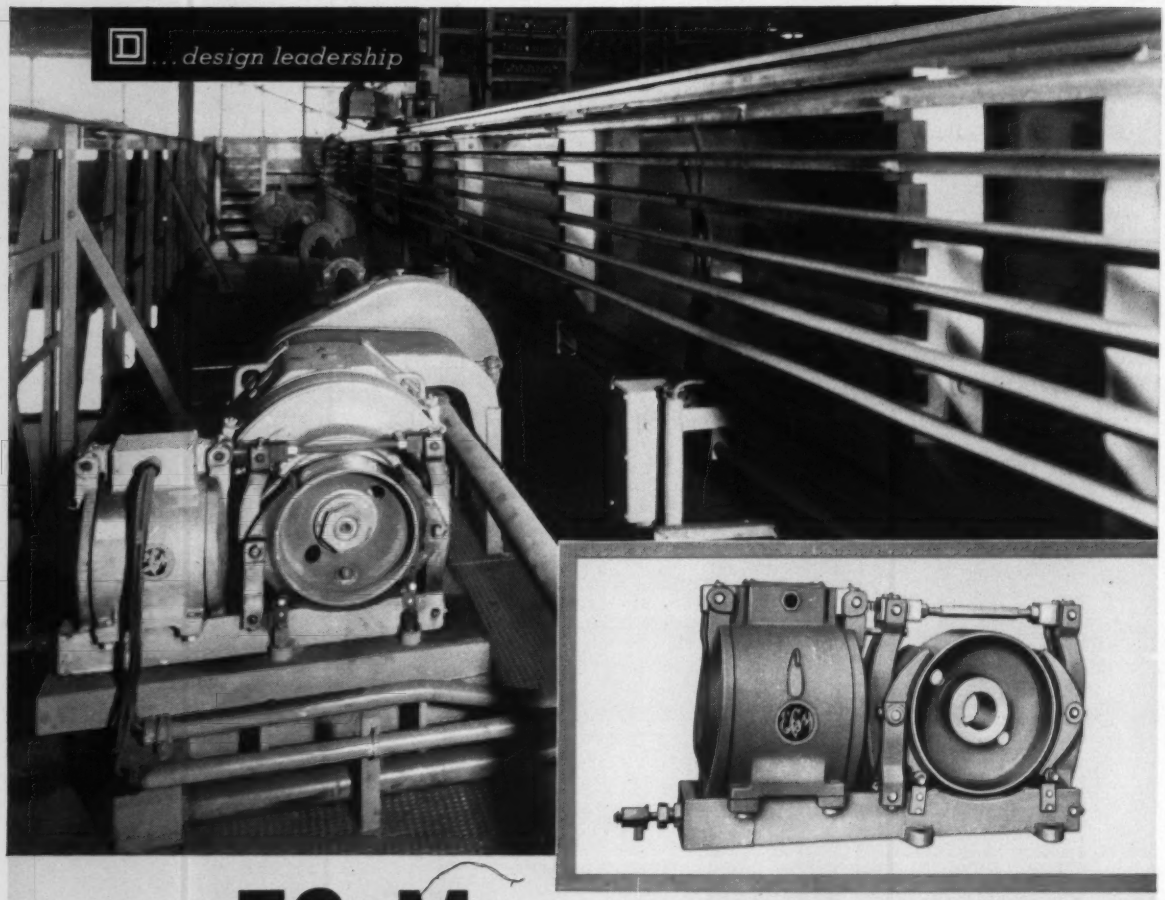
One example: These stainless clad automotive bumpers flanking William B. Pierce, vice president-sales, Allegheny Ludlum Steel Corp. For more evidence that clads are on the move, see Page 56.



How to Sell It to Labor

No. 12 in Steel's Program for Management

CONTENTS—TURN PAGE



NEW EC&M ELECTRIC BRAKE for both PARKING and SERVICE

For the first time, here is an all-electric brake which combines an emergency or parking brake with a service brake. The new **AT** (**A**djustable **T**orque) brake was primarily designed for EOT crane bridge drives, but is equally well suited for travel motions on transfer cars, coke pushers and similar applications.

The new **AT** brake has important advantages. There are no hydraulic or air lines which can be affected by vibration or temperature extremes. Being electrically operated, the **AT** brake can be used with man-trolley and floor-operated cranes.

The new EC&M brake consists of two magnets and two armatures on a single frame. An easy-to-operate foot pedal applies 3 points of adjustable torque for controlled service braking. In addition, a separate spring-applied torque provides parking and emergency braking on power failure. Both service and emergency braking torques can be adjusted independently to fit the application.

The new **AT** brake is easy to install and maintain. Only three control leads (or collectors) are required for brake operation. **AT** brakes meet all AISE ratings and mounting dimensions.

For further information, contact your local Square D Field Engineer, or write Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

wherever electricity is distributed and controlled

4533

This Week in STEEL
The Metalworking Weekly

June 6, 1960 Vol. 146 No. 23

Metalworking Gains on Management Rights Issues

Headway is unspectacular but still discernible. It's coming chiefly in these areas:

1. Work standards.
2. Contracting work out.
3. Plant closings and relocations.
4. Resistance to pattern settlements.

PAGE 53

How Huck Changed Its Marketing to Keep Pace

Huck Mfg. Co., Detroit, is reorganizing its sales setup from territories to industry markets. Reason: The 20-year-old fastener maker is after deeper market penetration, better customer relations, and upgraded sales training methods. Explains George Q. Mathews, sales vice president: "We have seen the need for more specialized sales engineering knowhow expand along industry lines as our markets have broadened, and we've developed new products. Our sales realignment will enable us to keep pace with this trend." For the details, see PAGE 58

Production Efficiency: How to Sell It to Labor

A new machine is only as good as the men who will operate it. A major issue in the steel strike was the attempt to win more union co-operation in making new equipment and manufacturing methods work. Needed is a better selling job to the workers plus a program to bring at least the foremen into the selection of new equipment. PAGE 63

Can Electron Beam Melting Compete?

The process may be competitive with either the consumable electrode or vacuum induction techniques. The furnace builder, Temescal Metallurgical Corp., Richmond, Calif., says the electron beam turns out superclean metals. PAGE 98

Data Processing Helps Firm Keep Grip on Costs

A data processing system cut clerical costs 30 per cent at Cadillac Gage Co., Costa Mesa, Calif., while production rose 150 per cent. The single system services production control, labor distribution, accounts payable, and tracks down trouble areas, says Cadillac. After printing, tickets go into these work-center files: Top ones hold backlog; center ones hold job cards which have been assigned to an operator; and lower files are for those in process. "Efficiency has been greatly improved," says Controller John Stone. "We are able to keep a tighter rein on our costs." PAGE 102

COMPLETE CONTENTS ▶

CONTENTS

Metalworking Week, Page 43

The Editor's Views—What Price Prosperity? 49
1960 Bargaining: Metalworking Gains on Management Rights Issues 53
Coal Mining Firm Gets Set to Produce Aluminum 54
IBM's New System Controls Complete Production Cycle 55
Clad Metals Move into New Markets—via products, processes 56
Tax Spurs Air Conditioner Sales—A STEEL survey 58
How Huck Changed Its Marketing to Keep Pace 58
Production Efficiency: How to Sell It to Labor 63
No. 12 in STEEL's Program for Management for 1960
Ceco Steel Integrates—New mill has 180,000 ton annual capacity 83

Technical Outlook, Page 97

Huge Unit to Check Economy of Electron Beam Refining 98
Why Tape Control Keeps Growing at Convair—Benefits add up .. 100
Data Processing Helps Firm Keep Grip on Production Costs 102
Machine Topics—Grindermaker Eyes Stock Removal Jobs 104
Progress in Steelmaking—Spring Suspension Cuts Roof Wear 106
Builder Unveils Product Strides—New machine tool technology .. 111
General Electric Shows Remote Control—Electronic command post 115
Modern Heat Treating Helps Firm Compete—Improves properties 116

Market Outlook, Page 133

Complete Index to Market News and Prices 133
Rail Steel Outlook: Good as 1959—Raw material supplies ample .. 135
Southwest Ingot Rate Off Because of Heavy Imports 138
Steelworks Operation Chart and District Ingot Rates 142
Scrap Price Index Resumes Decline—Falls to $32 156
Nonferrous Metals—Prices Firm for Now 158

WHERE TO FIND

Servicenter 5
Calendar of Meetings 10
Editorial & Business Staffs 16
Metalworking Pulse 46
Windows of Washington . 60
Mirrors of Motordom 69
The Business Trend 73
Men of Industry 77
Obituaries 80
New Products 119
New Literature 130
Advertising Index 163

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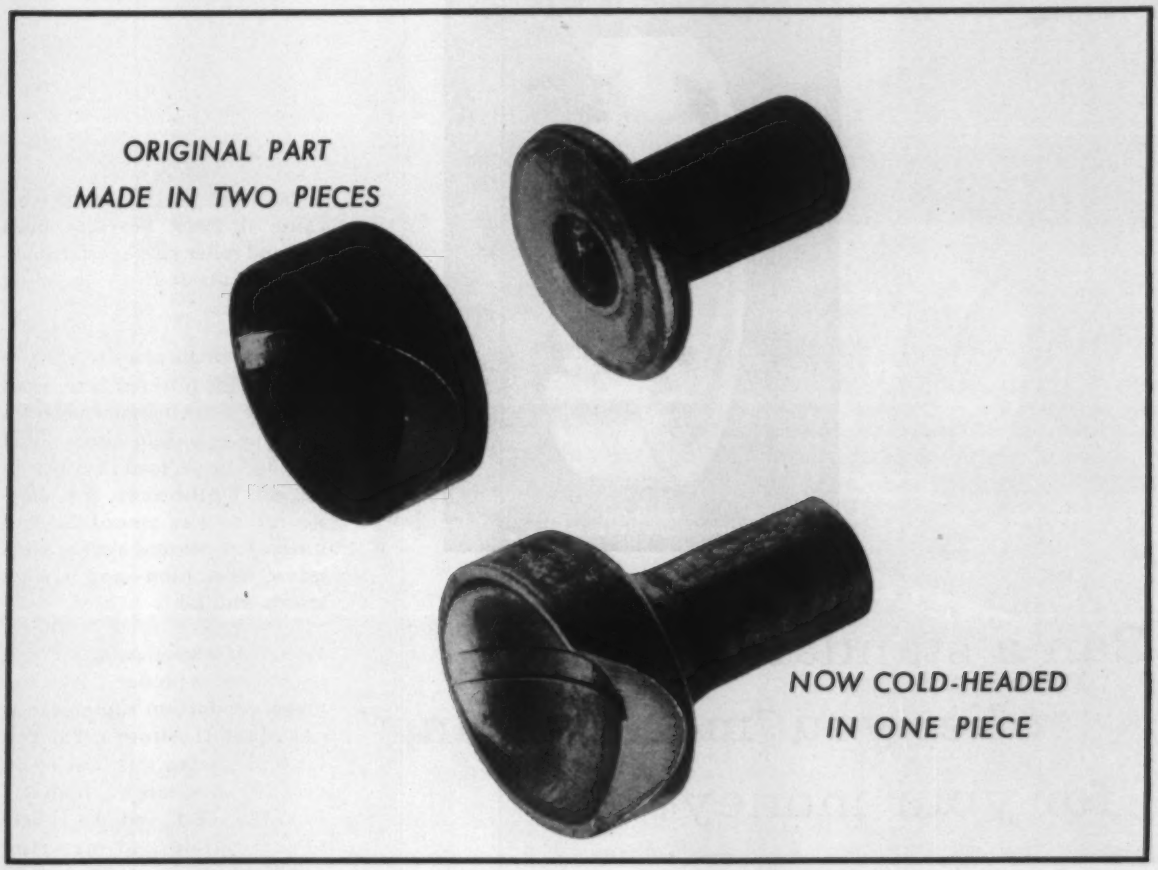


Cold-heading cuts costs— replaces two parts with one!

The two-piece part, comprising a stud and a seat, has been replaced by a single part which is now cold-headed at considerable savings. It's used in the assembly of an automotive steering-rod relay system.

A special type of Bethlehem cold-heading wire was developed for this job. Costs are well under the previous method of manufacture. Cups have good surface finish and high strength.

This is a typical example of the small parts which are constantly under study by manufacturers searching for better materials, improved methods, and lower costs.

Look at these advantages of cold-heading

High-speed production . . . low scrap loss . . . economical stock . . . high strength . . . minimum of finishing operations.

Perhaps your product can be cold-headed

Heading-quality wire, custom-made for the job, has long been a Bethlehem specialty. Our metallurgical engineers will gladly work with you if you have a product that might be cold-headed. For any of your wire needs, call your nearby Bethlehem office, or write us at Bethlehem, Pa.

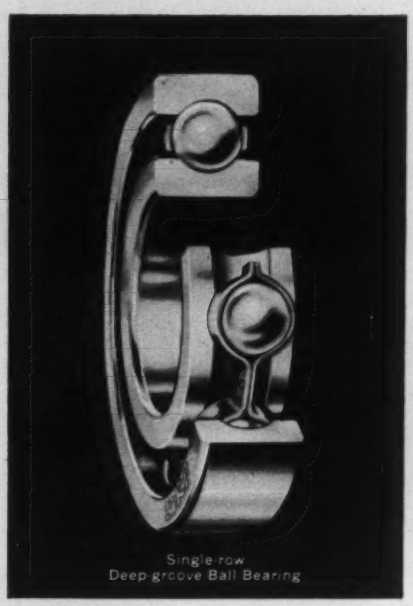
Steel

For strength . . . economy . . . versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



Can a standard bearing offer you "more bearing" for your money?

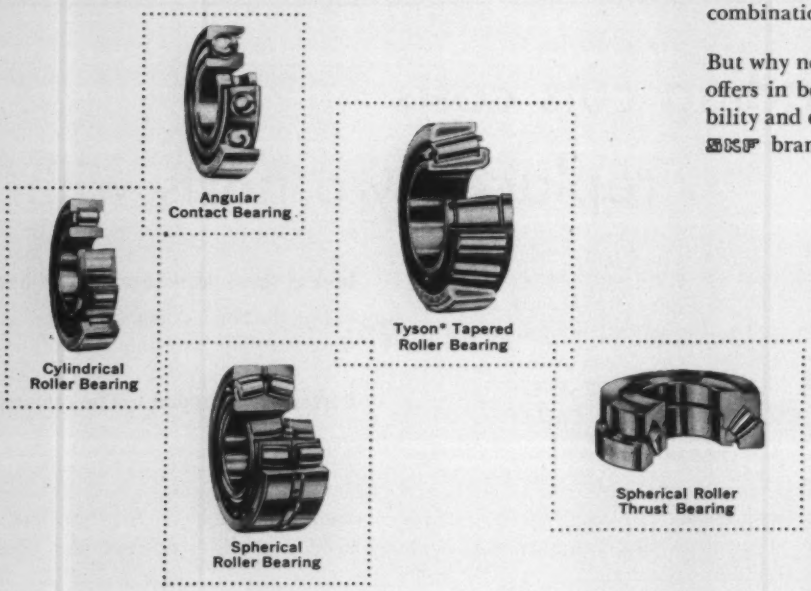
It can if it's made by SKF—because all SKF bearings, both ball and roller, offer special qualities at "production" bearing prices.

Take the single-row deep-groove ball bearing featured here, as an example. SKF designs and builds this type to sustain heavy radial load and thrust load in either direction. Furthermore, it is engineered to run smoothly and quietly at normal speeds with grease lubrication—and at high speeds with oil.

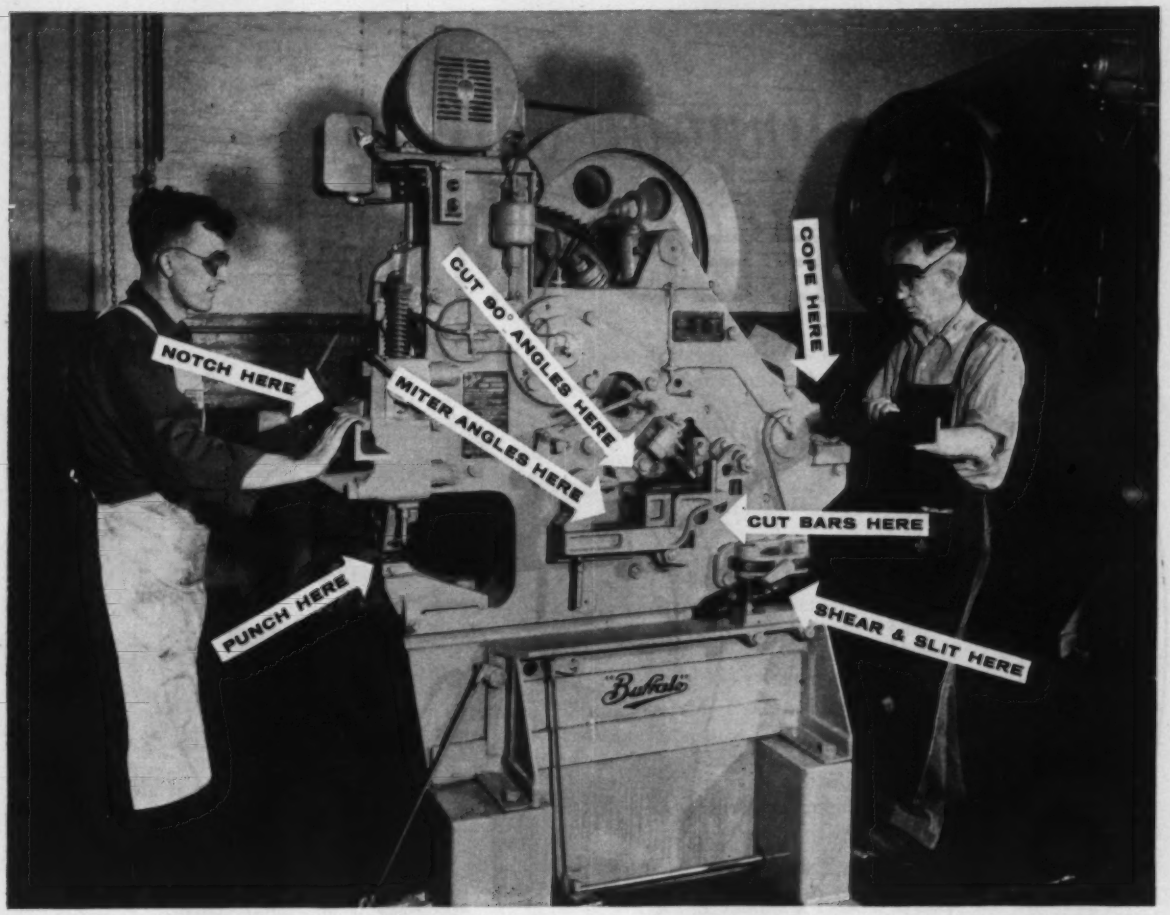
Yet this is a standard SKF ball bearing, mass-produced by automated production equipment at our plant at Altoona, Pa. You can quickly get this bearing in over 100 sizes, ranging from 5/8" to 15.748" O.D., and in a variety of seal, shield and snap-ring combinations.

But why not find out what SKF offers in bearing quality, availability and economy? Just call the SKF branch office nearest you

6001



Spherical, Cylindrical, Ball, "Tyson" Tapered and REED Miniature Bearings
EVERY TYPE—EVERY USE
SKF
SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.



SEVEN OPERATIONS—SAME MACHINE

SAVES ON MAINTENANCE AND PRODUCTION

A BUFFALO Iron Worker can be the most useful, productive and cost-saving machine in your shop.

Without changing tools, it will do a variety of jobs — **several at the same time.**

It's compact, ruggedly-built, requires practically no maintenance and is available in your choice of sizes and models.

Worth investigating, a BUFFALO U. I. W. pays its own way and returns dividends. Maybe you can't afford to be without one. Write for Bulletin 322 or . . . better still . . . call in your nearest BUFFALO representative.

"Buffalo"

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Buffalo air handling equipment to move, heat, cool, dehumidify and clean air and other gases.

Buffalo Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

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...pilot operated control valves

• Built to JIC standards • interchangeable pilots • choice of mounting types, optional features • ac or dc, any voltage • ¼ to 1 in. NPT

SPEED KING solenoid pilot coils, potted in molded resin, are unconditionally guaranteed against coil burnout for the life of the valve! And, Speed King pilots are totally enclosed, and sealed against entrance of dirt or moisture . . . valves are fully air-operated for speed and dependability . . . feature a hard-chrome plated stainless steel plunger floating in O-rings, to eliminate wear-producing metal-to-metal contact.

For multi-million cycle dependability, specify Valvair® SPEED KING control valves.

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Write for free Bulletin SK-100. Address: Bellows-Valvair, Akron 9, Ohio, Dept. ST-660

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DIVISIONS OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

Giant Coverage

Our Market Editor Bill Rooney (right) listens as Robert G. Welch, executive vice president of the Steel Service Center Institute, reads: "Keep long range goals in sight. . ." a line from the jumbo size blowup of a story written by Bill. That quote, in essence, tells how the enlargement of the story, and another one of our May 16 cover, appeared on the stage during the institute's fifty-first annual meeting in Miami Beach, Fla.

Months ahead of the meeting, Bill began gathering material for his story. He got speeches, interviews, and photos—then combined them in an editorial package in time for institute officials to make the giant reproductions.

To top it off, Harris T. Gregg, vice president, Metal Goods Corp., Houston, and chairman of the institute's Public Relations Committee, read excerpts from Bill's story to nearly 1000 attendees.

Bill has been around metalworking markets for more years than he will let us talk about. If he displayed a blase attitude, it would be easy to understand. But about this event, Bill gets a gleam in his eye and says: "Yes sir, there they were, big as life—why, bigger than life! First time that's happened in . . . well, a long while."

Our Congratulations Go to . . .

. . . Connors Steel Div., H. K. Porter Company Inc., Birmingham, for winning the institute's award for the best single advertisement in the interest of Steel Service Centers. B. C. Blake, group vice president, accepted the award for the company.

. . . Bethlehem Steel Co., Bethlehem, Pa., for receiving an award for the best advertising program. J. V. Honeycutt, vice president-sales, accepted the award.

. . . Jones & Laughlin Steel Corp., Pittsburgh, for winning two second place awards. One for a single ad and the other for its ad program. The awards were acknowledged by C. M. Merritt, general manager of sales.

. . . Kaiser Steel Corp., Oakland, Calif., for the special award honoring its TV commercial on Maverick.

Six Predictors Will Profit . . .

. . . from STEEL's Beat-the-Experts Contest. The reader who comes closest to the figure for U. S. passenger car production for calendar 1960, will win two weeks of wheeling around any Ford Div. car of his choice. There are 21 models to choose from—the Falcon through the T-Bird.

Virgil M. Exner, Chrysler Corp. vice president and director of styling, created a dream car print in full color expressly for the contest. Five next best guessers will win prints. To enter just use the coupon in this department. You could be a winner.

One of the 1600 Entrants . . .

. . . in our Beat-the-Experts contest for the first half of 1960 will get behind the wheel of a new Ford in July or August. The prizes are the same as those in the current contest. We'll spread the news about the first half, 1960, winners in July.

Management Series Booms Along

"The article on depreciation reform in the Apr. 18 issue is the finest summary I have ever seen. I'd like to place a copy on the desk of each of our member companies. Thanks for the assistance you can give in 'spreading the good word.'"

Twenty copies were sent to the writer, Joe H. Peritz, executive secretary, Electric Overhead Crane Institute, Washington.

C. Perdue, purchasing agent, Machinery Purchasing Dept., Ford Motor Co., Dearborn, Mich.,

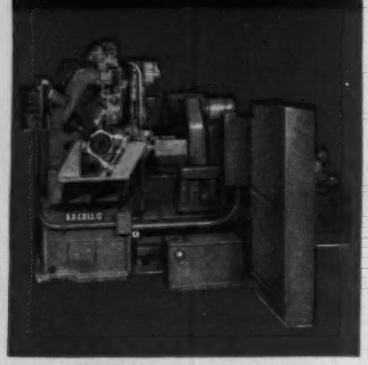
I believe _____ automobiles will be produced in the U. S. from Jan. 1 through Dec. 31, 1960.

Mail this to:
Ed Service
Beat-the-Experts
STEEL
1213 W. 3rd St.
Cleveland 13,
Ohio

PRINT NAME _____
POSITION _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____

Entries must be postmarked before midnight, June 30.

Step-by-Step Automation with Ex-Cell-O Specials



Your first step into automation may cost much less than you think. In medium-sized shops, for example, a profitable, automated set-up may involve the purchase of a relatively simple transfer machine, such as the one illustrated above, consisting of two standard way-type units. Or, even more simply, a single standard machine which easily fits into automated set-ups later on.

In any case, a host of Ex-Cell-O engineers, laboratory technicians and production specialists are at your service. *No obligation whatsoever.* Call your Ex-Cell-O Representative or write Ex-Cell-O, Detroit.

SEND FOR FREE BROCHURE

This 20-page catalog will show you the most profitable way to put automation into your present operations—make your own "Automation Appraisal." Ask for Bulletin 50155.

XLO EX-CELL-O FOR PRECISION
57-88

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

requested 100 copies and commented: "If we are to maintain a strong industrialized nation, and a machine tool industry which is equipped to meet and outproduce world competitors, then we must provide the means for financing through depreciation allowances.

"I feel your article is thorough and clearly states the need, however, the battle must be carried to our representatives by individuals."

Auction in Reverse

At the urging of the president of a structural steel company, News Editor Bill Dean has developed a story about the profitless prosperity in the steel fabricating industry. If your industry has excess capacity and is experiencing price cutting on contracts, take a look at what Bill discloses next week. He has learned it's easy to cut a price before bids are opened. All it takes is a visit with the guy letting contracts. Ask him how bids are going and he'll inform you, confidentially, that your bid is high. You ask: "If I cut 5 per cent, will I get the contract?" A nodded assent, or an indication for a bigger cut, sends you on your way to refigure the bid—and to possible bankruptcy.

If 20 contractors bid on a bridge job, building, or what have you, imagine the above scene repeated 20 times—then think of what happens to profit margins. Too often, the controlling question is: "How much can I afford to lose on this job?"

June Usership Contest Opens

There are four issues of STEEL this month—and one could help you win $1000 in our Usership Idea of the Month Contest.

Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—June, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—you will win $500.

There's more . . . You will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

You can enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. Deadline for this month's contest is Aug. 1.

CAM BORE PRECISION... AT THREE TIMES THE SPEED OF A BAR AUTOMATIC

STANDARD STYLE 308 BORES AND CONTOURS MINIATURE BEARING RACES FROM BAR STOCK

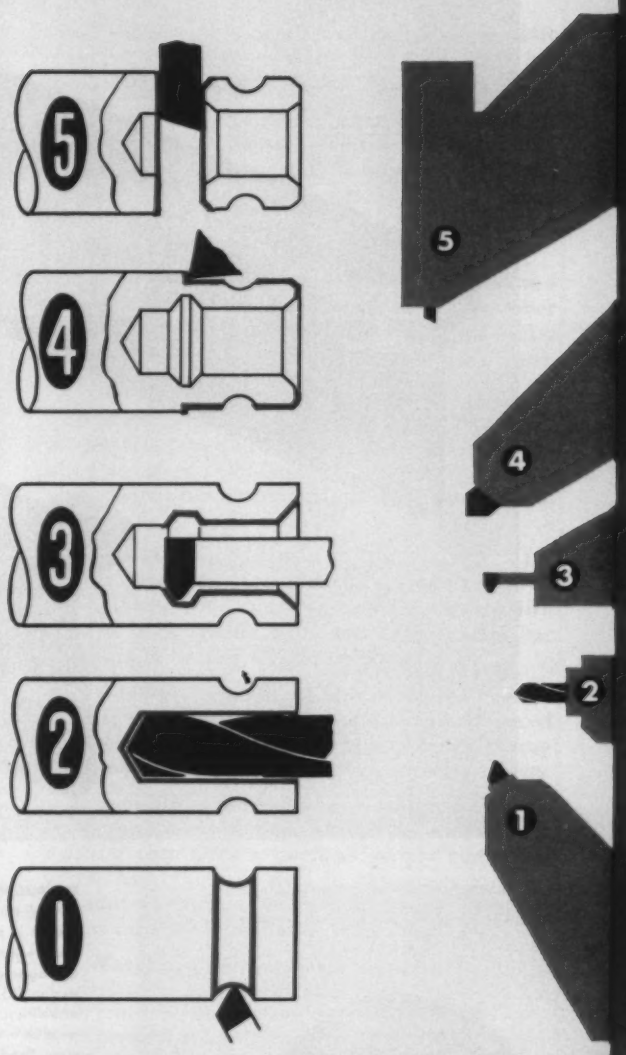
Take a standard Ex-Cell-O Style 308 Cam Boring Machine, feed bar stock through its Ex-Cell-O Precision Spindles, and add the tooling shown at right.

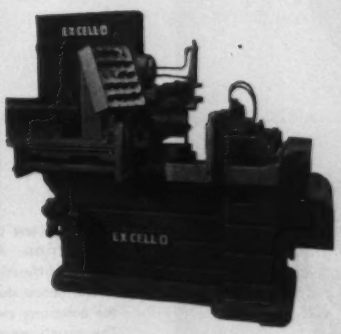
The result: 380 miniature bearing races per hour, gross—produced three times faster, 10 times more accurately, and with more operations and a finer finish than possible with the bar automatic assigned to the same work!

Ex-Cell-O Precision Cam Boring Machines use direct cam action on table and cross slide to perform an endless variety of boring and contouring work. To change the part form, the operator simply changes two convenient cams and tool blocks.

How many ways can you use a versatile boring machine like this in your work? Get the fact-story from your Ex-Cell-O Representative, or write direct for details on the complete line.

SEE EX-CELL-O'S BOOTH 946, NMTBA EXPOSITION





ABOVE: Operations are (1) generate track, (2) drill, (3) back chamfer and contour bore I.D., (4) face, chamfer and turn O.D., (5) chamfer O.D. and cut-off. LEFT: Style 308 Cam Boring Machine. FAR LEFT: Part (shown 2½ times actual size) is 440C stainless steel. Tolerance is held to plus or minus .00025", finish to 20 RMS.

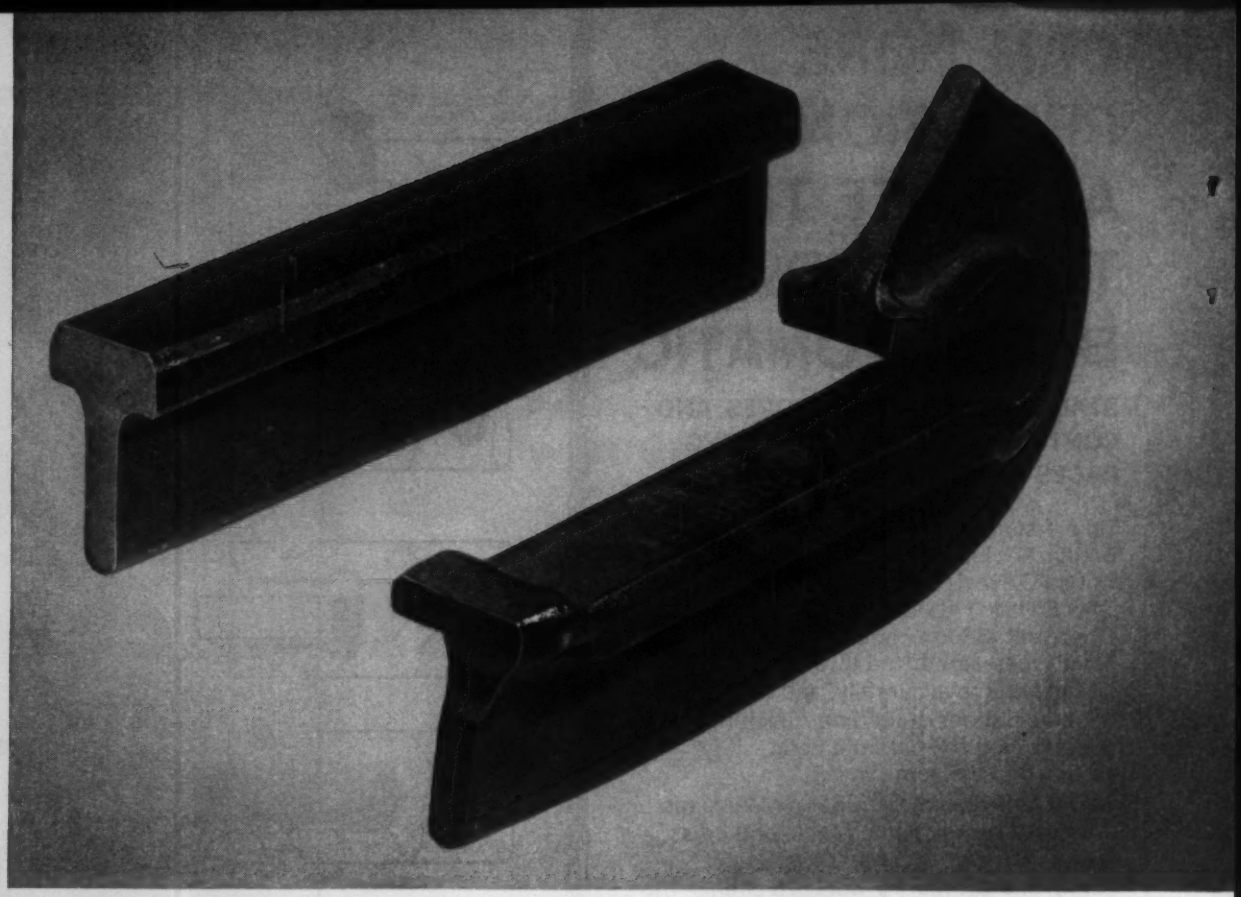
60-28

EX-CELL-O FOR PRECISION

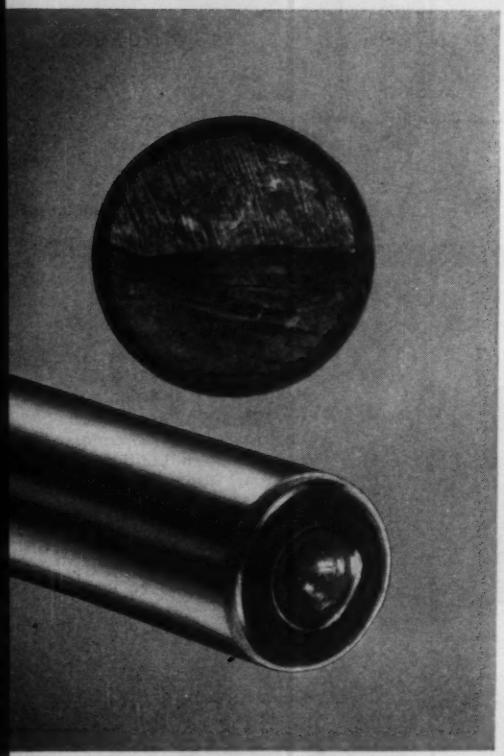
MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • CONTOUR PROJECTORS • GAGES AND GAGING EQUIPMENT • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • ATOMIC ENERGY EQUIPMENT • RAILROAD PINS AND BUSHINGS • DAIRY AND OTHER PACKAGING EQUIPMENT

Machinery Division

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN



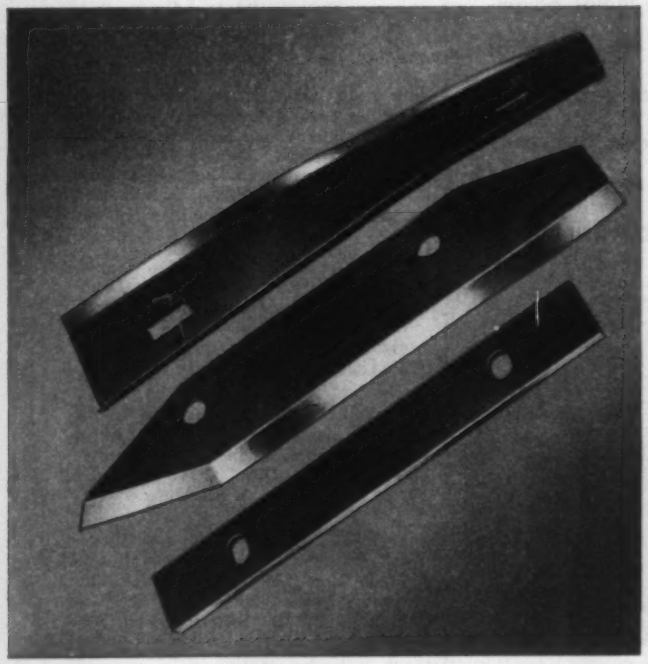
REPUBLIC HOT ROLLED SPECIAL SECTION REDUCES COST on this rail anchor through elimination of most machining and forming operations. The special section is preformed to the predominating cross section of the part. If you design or produce steel parts you will be interested in these advantages of Republic Special Sections: (1) Almost limitless flexibility in design. (2) One-piece shapes replace costly assemblies. (3) Simplification of built-up, interlocking or associated parts. Republic Special Sections are available hot rolled or cold drawn in carbon, alloy, titanium, and stainless steel. Send coupon for full facts.



3-D METALLURGICAL SERVICE HELPS AGRICULTURAL KNIFE MANUFACTURER SLASH PRODUCTION COSTS. Lund Products Company, Maynard, Massachusetts, produces cutting knives for agricultural equipment. A quality product, Lund wanted to make them better to withstand even the most severe abuse. Republic metallurgists offered advice on practices and procedures in working alloy steels. The result? A superior cutting knife, produced at a substantial reduction in cost. 3-D Service is available to all steel users without obligation. Clip and mail coupon.

COLD DRAWN CARBON CORRECTED BARS HELP BOOST PISTON PIN PRODUCTION. A leading engine manufacturer was experiencing production difficulties and was not satisfied with piston pin quality from a performance standpoint. On the advice of a Republic Field Metallurgist, the company switched to Republic Cold Drawn Carbon Corrected Bars. The results were immediate. Production increased substantially. Rejects dropped to a minimum. Pin quality maintained at the highest level. Other advantages of Cold Drawn Carbon Corrected Bars include: Better machinability. Savings in both metal and money by eliminating waste. No need to buy bars oversize to allow for decarb removal. Note induction hardening in cutaway view of the piston pin.

YOU BENEFIT SEVEN WAYS FROM REPUBLIC STEEL BAR "SERVICE IN DEPTH"



Steel bar service in depth is an exclusive Republic concept, designed to help you solve steel bar problems and to benefit you these seven ways:

1. Facilities — Republic bar mills are strategically located in relation to major use areas. Hot rolled mills at Cleveland, Youngstown, Buffalo, Massillon, Chicago, Canton, Gadsden; cold finished mills at Massillon, Gary, Beaver Falls, Hartford, and Los Angeles.

2. Abilities — Republic's broad and specialized experience has been gained as the nation's number one producer of alloy and carbon bars, and leader in the production of special quality steels, such as forging bars.

3. Shapes and Sizes—Modern bar mills produce a complete range of sizes and materials—carbon, alloy, stainless, and titanium—in ¼″ to 10″ rounds, also squares, hexagons, octagons, flats, and special sections.

4. Variety—In addition to regular merchant quality, production includes coil spring and spring bar quality, cold heading and cold extrusion quality, high quality alloy and carbon steel bar products in heavier weight coils.

5. Quality—Republic combines quality control at every step of production with the most advanced features of bar mill design to meet today's exacting requirements for high quality steel bar products.

6. Dependability — Republic's aim has been to build capacity to provide more steel tonnage for existing customers as well as supply additional users. Assurances of steel to customers are real assurances. Orders are not taken by Republic unless capacity is available to fill them.

7. Metallurgical Service — Republic's famed 3-Dimension Metallurgical Service Teams—field, mill, and laboratory—are always available to help your personnel apply Republic's high quality bar products to your product. Carbon, alloy, stainless, and titanium metallurgists will assist in the selection, application, and processing of the right bar product for the job. No obligation. The coupon is your invitation to use this service.

Here are three examples of steel bar *service in depth.*

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. ST -7700-B
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

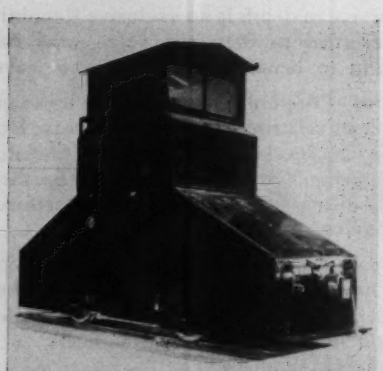
Have a metallurgist call: ☐ Carbon ☐ Alloy ☐ Stainless
Send more information on:
☐ Cold Drawn Special Sections ☐ Alloy Steel Bars
☐ Carbon Corrected Bars

Name_____ Title_____

Company_____

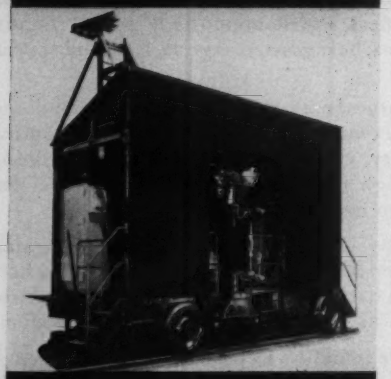
Address_____

City_____ Zone____ State_____



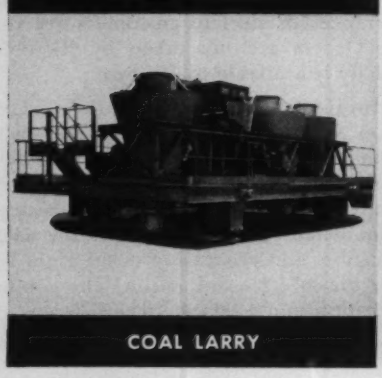
QUENCHER LOCOMOTIVE

COKE ON THE MOVE



DOOR MACHINE

Operating economy and long life, again, are major advantages of Atlas equipment for highly specialized coke-producing service. Specially designed and ruggedly built to your exacting requirements.



COAL LARRY

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ATLAS CAR & MFG. COMPANY

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CALENDAR OF MEETINGS

June 6-8, Malleable Founders' Society: Annual meeting, Elbow Beach Surf Club, Hamilton, Bermuda. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

June 6-8, American Gear Manufacturers Association: Annual meeting, Homestead Hotel, Hot Springs, Va. Association's address: 1 Thomas Circle, Washington 5, D. C. Executive director: John C. Sears.

June 6-9, National District Heating Association: Annual meeting, Grove Park Inn, Asheville, N. C. Association's address: 827 N. Euclid Ave., Pittsburgh 6, Pa. Secretary-treasurer: John F. Collins Jr.

June 13-15, Metal Powder Industries Federation and Metallurgical Society of AIME: International conference on powder metallurgy, Biltmore Hotel, New York. Federation's address: 60 E. 42nd St., New York 17, N. Y. Executive secretary and treasurer: Kempton H. Roll.

June 15-17, American Marketing Association: Annual meeting and exhibit, Leamington Hotel, Minneapolis. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive director: Vance E. Lockhart.

June 19-21, Alloy Casting Institute: Annual meeting, Homestead Hotel, Hot Springs, Va. Institute's address: 1001 Franklin Ave., Garden City, N. Y. Executive vice president: E. A. Schoefer.

June 19-22, American Institute of Chemical Engineers: Summer meeting, Del Prado Hotel, Mexico City, Mex. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

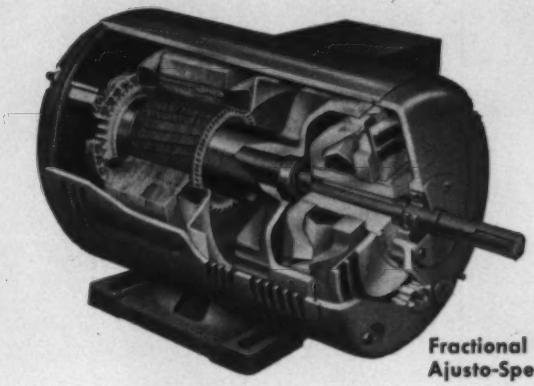
June 19-24, American Institute of Electrical Engineers: Summer general meeting, Chalfonte-Hadden Hall, Atlantic City, N. J. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

June 26-29, Drop Forging Association: Annual meeting, Seignory Club, Papineau County, Quebec. Association's address: 55 Public Square, Cleveland 13, Ohio. Executive vice president: Dwight M. Allgood.

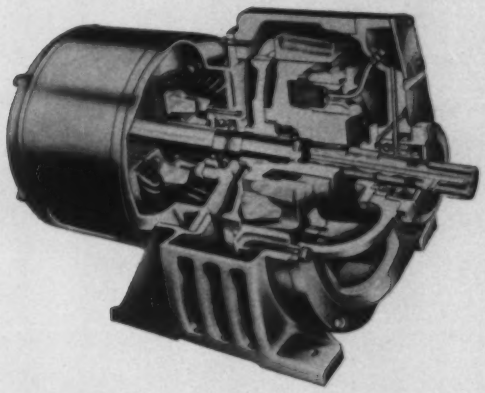
June 26-30, Caster & Floor Truck Manufacturers Association: Semiannual meeting, Equinox House, Manchester, Vt. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: Harry P. Dolan.

Bring Your Speed Control Problems to

EDDY-CURRENT HEADQUARTERS



Fractional HP
Ajusto-Spede Drive



Air-Cooled Ajusto-Spede Drive

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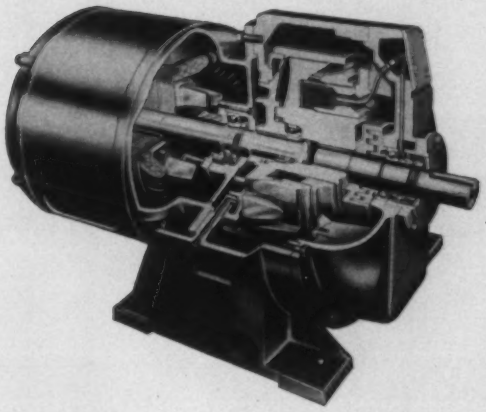
Let Our Years of Speed Control Experience Go to Work for You!



Liquid-Cooled Heavy-Duty Drive

30 years ago Dynamatic pioneered the utilization of eddy-currents in industrial rotating equipment. Today, the Dynamatic Division of Eaton Manufacturing Company is the recognized leader in the development and production of eddy-current drives, couplings, brakes, and dynamometers—equipment which is solving production problems in every major industry.

In speed control applications, Eaton-Dynamatic Eddy-Current Equipment offers many exclusive advantages—stepless adjustable speeds from AC power, rapid response, wide speed range, quiet operation, low power loss, low maintenance cost, remote control, simple electronic or transistorized control.

Dynamatic Eddy-Current Equipment is available in sizes from 1/4 hp Ajusto-Spede Drives to heavy-duty couplings rated up to 20,000 hp—and larger.

When you have a speed control or drive problem, bring it to "Eddy-Current Headquarters"—we can provide a simple, economical solution.

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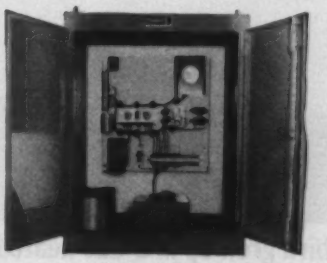

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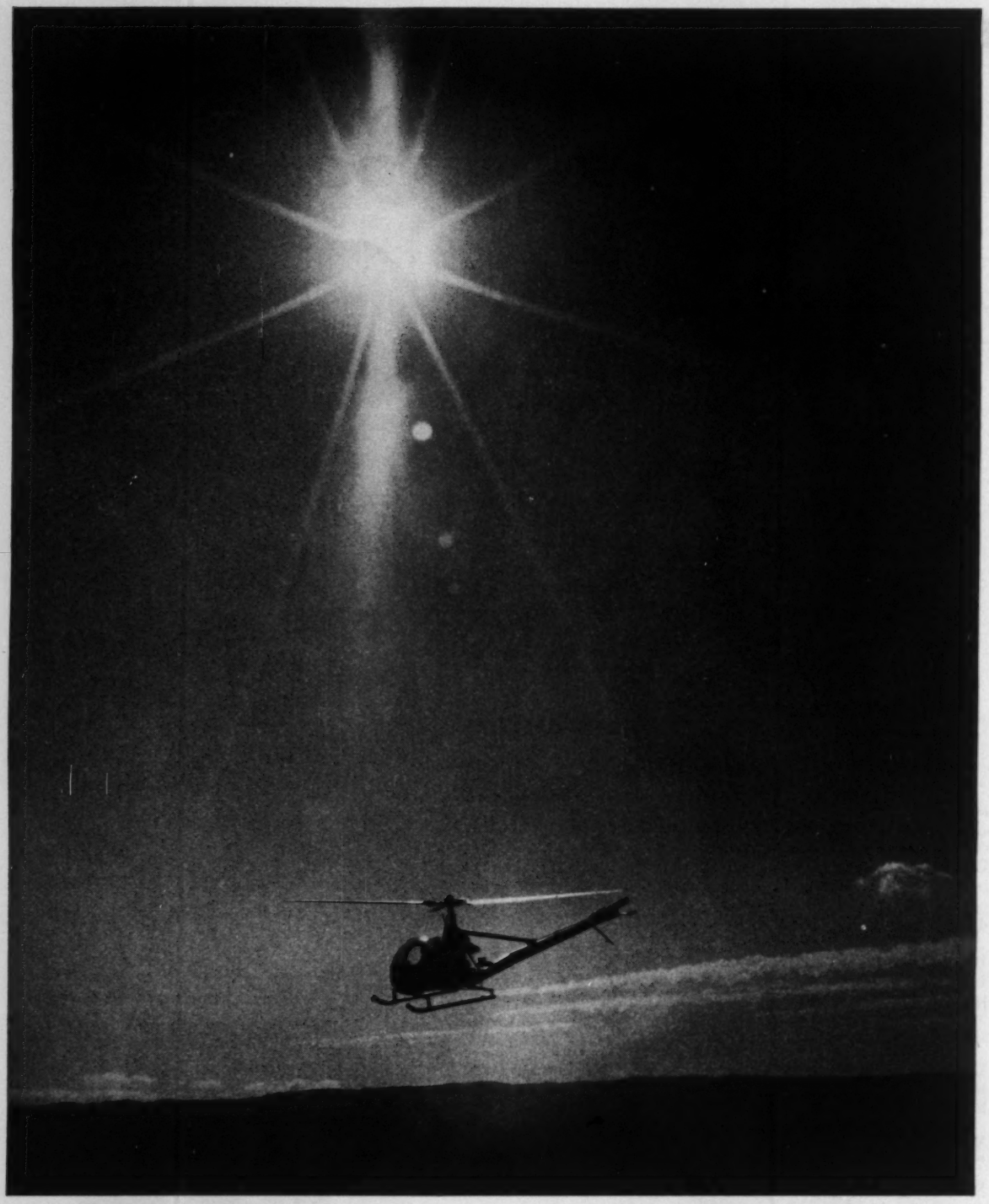

This bird grew up in a Gas-heated nest. The nest is the plant of Hiller Aircraft Corporation in Palo Alto, California, where gas is used exclusively in the heat processing of aircraft parts. From the big bubble up front to the rotor blades in its tail, nearly every part of a Hiller helicopter is processed with gas heat. Gas heat cures plastics, anneals metals, dries paint, heats solutions for plating . . . keeps the plant itself warm in winter. Hiller Aircraft—and thousands of other companies—use gas heat because it is completely controllable, fast, clean, economical. Gas is technically right and economically sound for all types of heat processing. Call the Industrial Sales Engineer at your local gas company for specific technical help. *American Gas Association.* **FOR INDUSTRIAL HEATING GAS IS GOOD BUSINESS**

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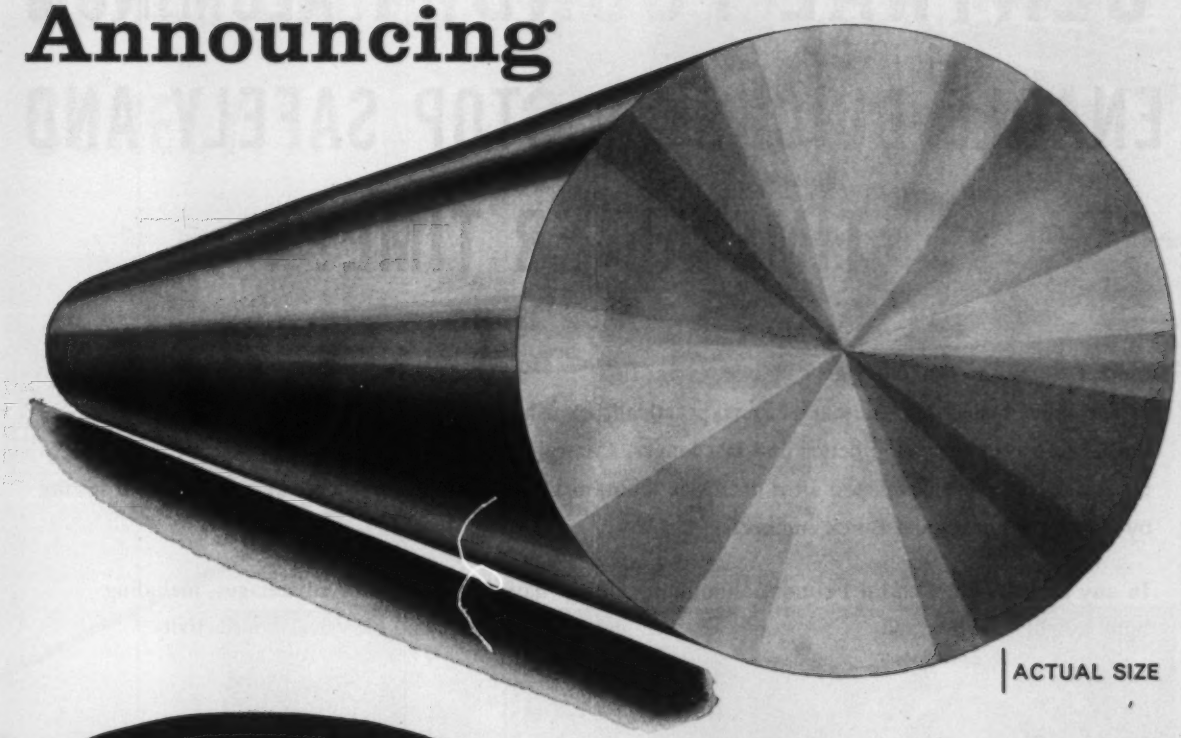

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Finned aluminum brake drums, cast by Central Foundry and used by Buick, dispel heat as much as five times faster than ordinary drums, practically banish brake fade, and allow the brakes to stay cooler, stop better and last longer. Central Foundry cast aluminum brake drums for Buick cars were developed after extensive laboratory research and thousands of miles of road testing by Central Foundry and Buick engineers.

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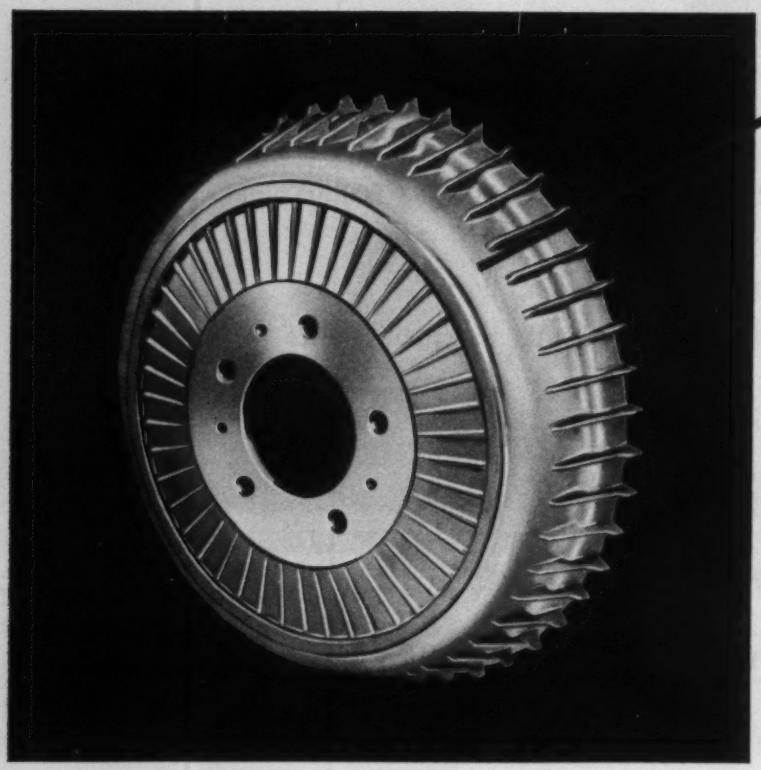
FRONT BRAKE DRUM



For assistance in the design, alloy specification and in the choice of the casting method best suited to the production of your part—write today for the new 24-page book on Aluminum Castings or ask for a Central Foundry sales engineer to call.

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1960 TURBINE DRIVE BUICK LE SABRE

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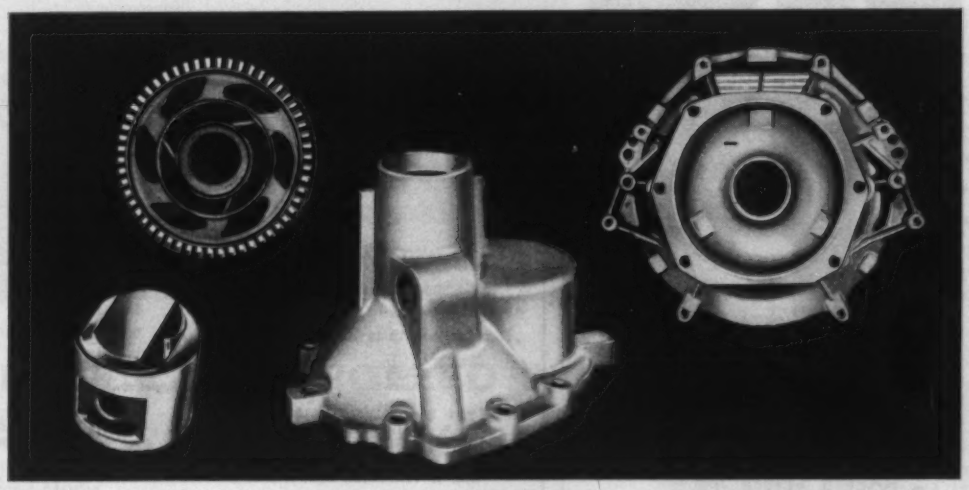

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Dozens of automobile components are being developed, tested and produced in aluminum which are greatly aiding car manufacturers in their efforts to lower weight, reduce costs and, at the same time, increase the economy and performance of their cars.

A FEW OF THE HUNDREDS OF ALUMINUM CASTING APPLICATIONS INCLUDE:

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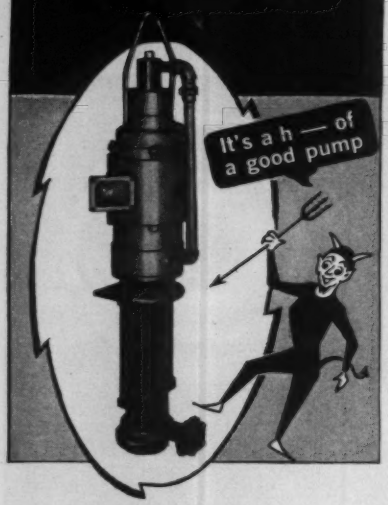

- SAVES TIME
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Steel

For Strength
. . . Economy
. . . Versatility

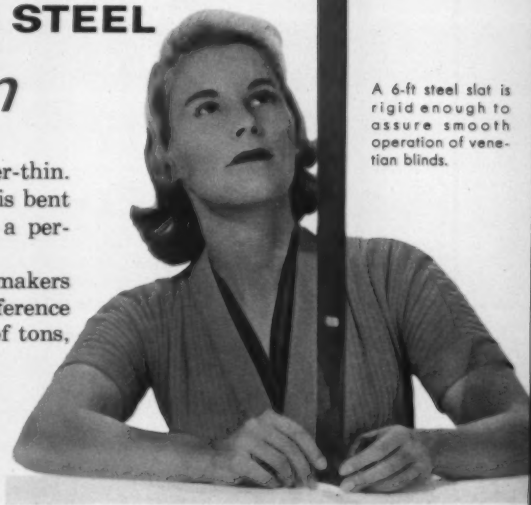
BETHLEHEM FLAT-ROLLED STEEL

. . . some like it thin

Venetian blind manufacturers like their steel almost paper-thin. They also like it strong and springy; so much so that if it is bent or even tied into a knot it will snap right back without a permanent set!

Only steel can meet those requirements. And leading makers of handsome, durable venetian blinds are showing their preference for steel by using Bethlehem blackplate by the thousands of tons, not only for slats, but for head- and bottom-rails, too.

We can furnish blackplate and tinplate as thin as .008 in.; as wide as 36 in.; in cut lengths, and in coils several miles long! If you make blinds, or cans, or closures; boxes, buttons, or eyelets; signs, tags, toys or waste baskets . . . a Bethlehem tin-mill product might help make them better.



A 6-ft steel slat is rigid enough to assure smooth operation of venetian blinds.

BETHLEHEM STEEL

BETHLEHEM STEEL

BETHLEHEM FLAT-ROLLED STEEL

...some like it thick

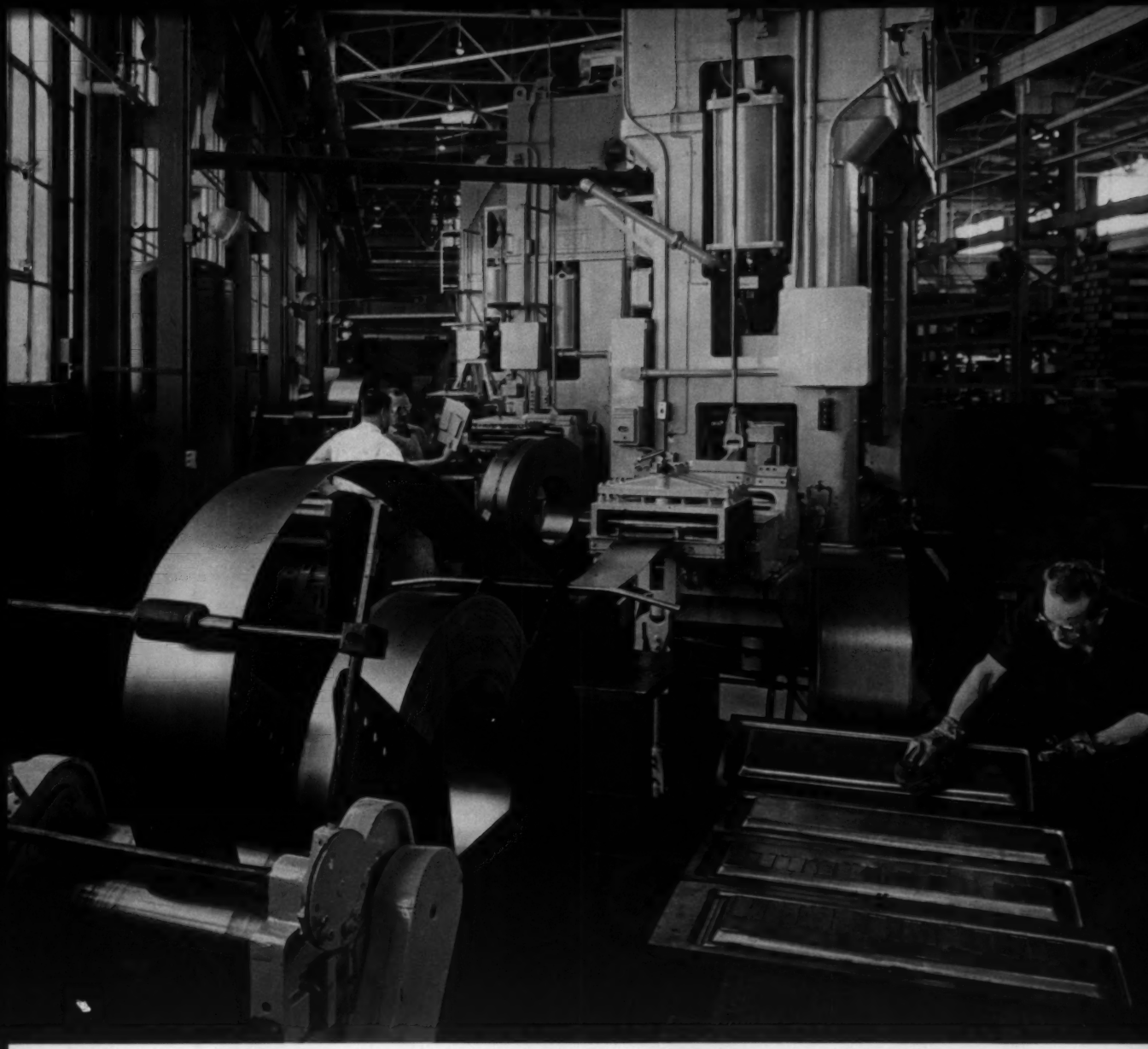
AS IN THIS GIANT TIRE-CURING PRESS

When your product is a hefty machine for curing rubber tires, such as this one being built at The McNeil Machine and Engineering Company, Akron, Ohio, you need your steel *thick*. McNeil uses Bethlehem steel plates in thicknesses up to 3¾-in.; Bethlehem can produce steel plates as thick as 15 in.

Bethlehem rolls plates in a full range of both sheared and universal mill sizes. Their uniformly high quality, together with proper welding techniques, result in sound welds every time. You can get full information from our nearest sales office; or use the coupon on page four of this advertisement.

Bethlehem engineers will help you with your steelworking problems

BETHLEHEM STEEL



...some like it in-between FOR HIGH-PRODUCTION STAMPING

This battery of presses at Federal Pacific Electric Company, Newark, N. J., includes one of 1,000 tons capacity—one of the largest in the electrical equipment industry. With its progressive dies, the giant press can stamp out complete enclosures at the rate of up to 20 per minute.

That's an impressive performance, both for the press and for the steel sheets. For their wide variety of needs, Bethlehem supplies Federal Pacific Electric with large tonnages of blue-ribbon sheets—hot-rolled, cold-rolled, and Bethcon continuously galvanized.

Our sheet mills at Sparrows Point, Md., and Lackawanna, N. Y., are equipped to turn out sheets in a wide range of gages, sizes, grades and surface finishes. If you work with steel sheets—in drawing, stamping, or simple bending—count on Bethlehem sheets for dependable performance.

BETHLEHEM STEEL

...do you roll your own?

YOU CAN GET THE FINEST HARDENED-STEEL ROLLS FROM BETHLEHEM

If you cold-roll steel sheet, strip, tinplate, blackplate, or non-ferrous metals, you can get the hardened-steel rolls you need from Bethlehem. We make them to your specifications for size, shape, hardness, finish. We can fit the smallest mill as well as the largest.

Hardened-steel rolls have long been a Bethlehem specialty. Our facilities are unsurpassed, and you can count on us for good delivery. Try us next time you need rolls.

STEEL

is strong... economical ...versatile

Here's a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:
Carbon and alloy AISI grades
Concrete reinforcing bars
Leaded steels
Special rolled sections

TOOL STEELS:
Water, oil, and air-hardening grades

ROD AND WIRE:
General and special-purpose types
Fine and shaped wire

FORGINGS:
Drop, press, hammer, and upsetter
Rolled-and-forged sections

SHEETS:
Hot- and cold-rolled
Continuously galvanized
Enameling sheets

TIN MILL PRODUCTS:
Electrolytic and hot-dip tinplate; blackplate

PLATES:
Universal and sheared
Flanged and Dished Heads

FASTENERS:
Bolts, cap screws, rivets
Special fasteners

STEEL PIPE:
Continuous butt-weld
Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

PALLET RACKS

WELDMENTS:
Frames, tanks, housings, vessels

FREIGHT CARS, PARTS, WHEELS, AXLES

WIRE ROPE AND SLINGS

RAILS:
Tee, crane, girder

CASTINGS:
Carbon, alloy, and stainless steel
Iron, brass, bronze

...AND BETHLEHEM MAKES IT IN NEARLY EVERY FORM

ROOM 1041,
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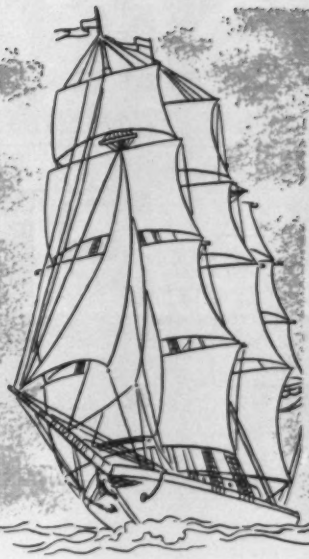
BETHLEHEM STEEL

BETHLEHEM STEEL

Why Rust-Oleum is different—

and what this difference, backed by 35 years of industry proof, means to you!



A Sea Captain developed it . . . Industry proved it!

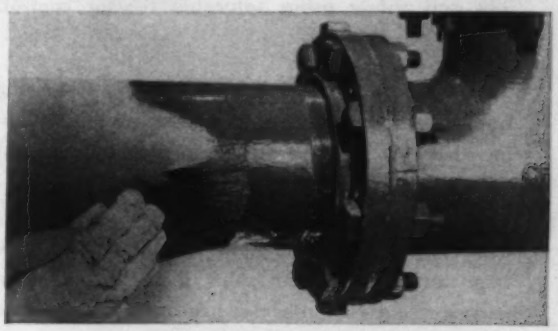
The original Rust-Oleum formula was developed nearly fifty years ago by Sea Captain Robert Fergusson, who became intrigued with the rust-stopping qualities of fish oil early in his career. Creating a *special treatment* for the fish oil, he used the *specially-processed fish oil* as the vehicle in combination with fine rust-inhibiting pigments. The result? A coating that actually *stopped rust* when applied directly over sound rusted surfaces, after scraping and wirebrushing to remove rust scale and loose rust. Possible, because the *specially-processed* fish oil penetrated the rust to bare metal. This was the birth of Rust-Oleum's *exclusive* 769 Damp-Proof Red Primer.

PROVED THROUGHOUT INDUSTRY FOR OVER 35 YEARS

Today, Rust-Oleum in its many systems and colors, has been proved throughout industry for over thirty-five years. This proof by leading industrial users is your assurance of savings in time, money, and metal. Economies made possible by the fact that Rust-Oleum 769 Damp-Proof Red Primer goes right over the sound rusted metal—usually eliminating costly surface preparations. And Rust-Oleum, in its various systems, resists rain, sun, fumes, heat, weathering, chemicals, etc., for lasting beauty over the years.

RUST-OLEUM NEW COLOR HORIZONS SYSTEM

The Rust-Oleum New Color Horizons System introduces a new coating concept to industry. It combines four important factors: (1) the ability to stop rust, (2) smart, modern color harmony, (3) the durability to last and last, (4) ease of application that saves time, money, and metal. See how this system can bring lasting beauty to your plant, machinery, equipment, pipes, tanks, structural steel, fences, etc. Write for complete information or contact your nearby Rust-Oleum Industrial Distributor. He maintains complete stocks for prompt service.



RUST-OLEUM®

There are imitations, but only *one* Rust-Oleum. It is distinctive as your own fingerprint.

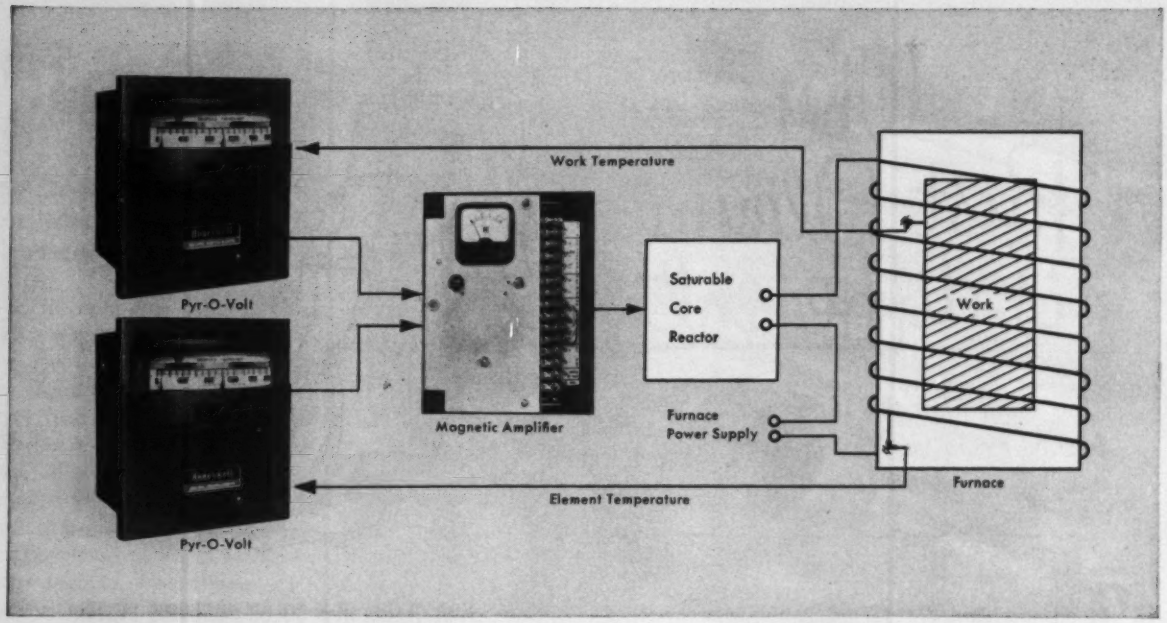
STOPS RUST!®

ATTACH TO YOUR LETTERHEAD

Rust-Oleum Corporation
2644 Oakton St., Evanston, Illinois

Please send me the following at no cost or obligation:

- ☐ New Color Horizons Systems Catalog featuring 110 actual color standards and 69 photo applications.
- ☐ Free test sample of Rust-Oleum 769 Damp-Proof Red Primer to be applied over sound rusted surface.
- ☐ Results of radioactive tracing study on Rust-Oleum fish oil penetration.



Electric furnace control system prevents overshoot, protects heating elements

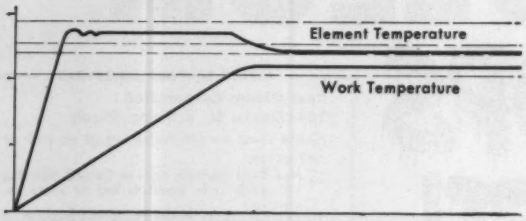
Here's the simplest, most economical way to bring electric furnace temperatures up to work level rapidly and safely using saturable reactor control.

This accurate Honeywell system holds fast-rising furnace temperature to a safe value as the slowly-increasing work temperature approaches its control point. The system consists of two *Pyr-O-Volt* controllers and a magnetic amplifier. Both controllers feed signals to the magnetic amplifier until work temperature reaches set point, then the work temperature controller assumes primary control of the system.

This relatively inexpensive system requires minimum maintenance, as no relays or other mechanical switching means are used. Both controllers have provision for fail-safe thermocouple burnout protection. In addition, automatic current limiting can be supplied with the system should you require extra protection for molybdenum heating elements.

Your nearby Honeywell field engineer can give you complete details on applying this system to advantage in your plant. Call him today . . . he's as near as your phone.

MINNEAPOLIS - HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.



Curves show the relationship of work temperature and element temperature vs. time in the *Pyr-O-Volt* furnace control system.

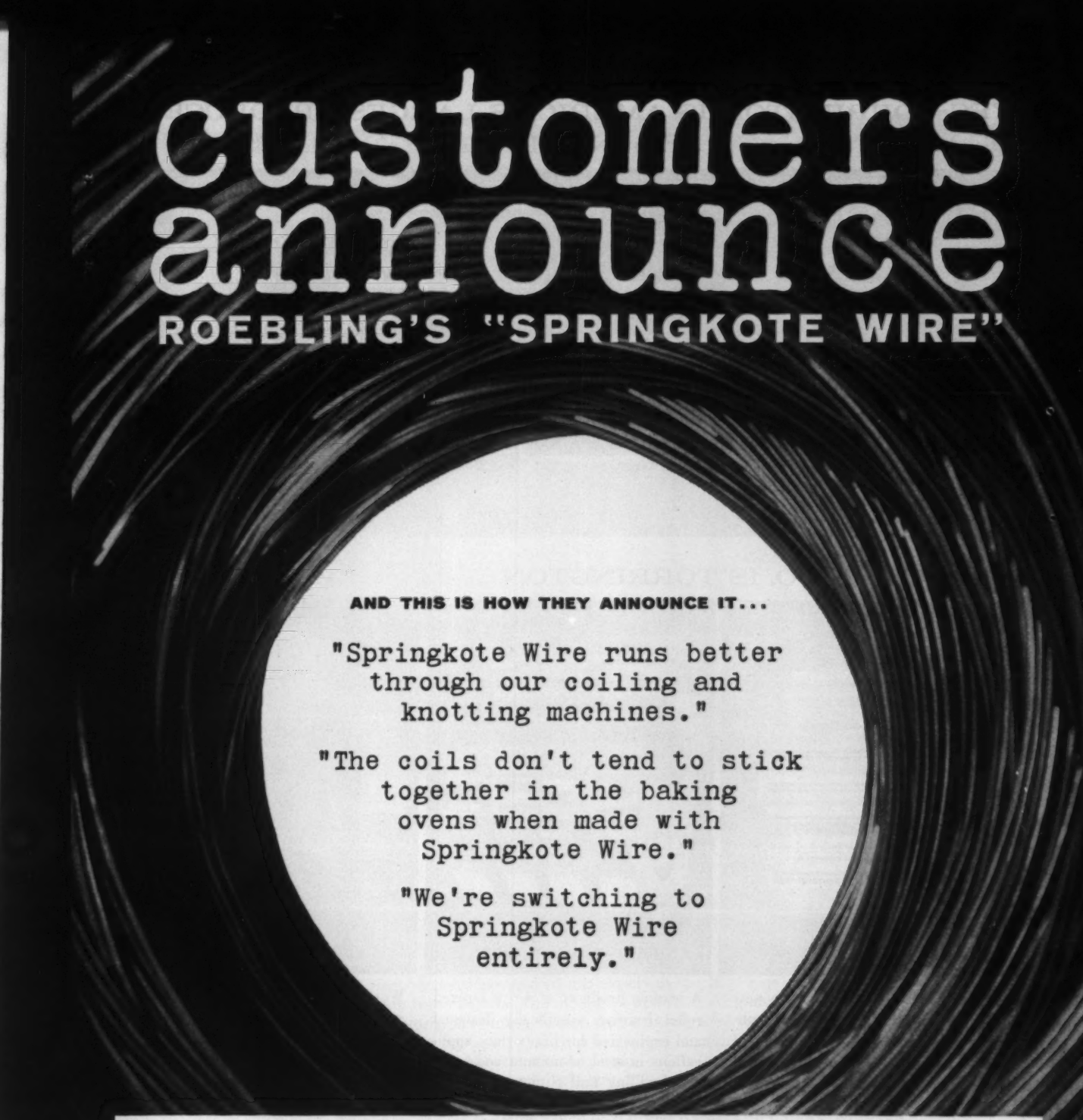
Honeywell

First in Control

SINCE 1885

75th YEAR

PIONEERING THE FUTURE


customers announce
ROEBLING'S "SPRINGKOTE WIRE"
AND THIS IS HOW THEY ANNOUNCE IT...
"Springkote Wire runs better through our coiling and knotting machines."
"The coils don't tend to stick together in the baking ovens when made with Springkote Wire."
"We're switching to Springkote Wire entirely."

And this is *why* our upholstery spring wire customers are telling you about Springkote Wire instead of us. With the advent of the electrical resistance heating method, lime-coated wire posed some problems during stress-relieving operations, burning out electrical contacts and often causing uneven heat distribution in coils. As an effective answer to the problem, Roebling developed Springkote Spring Wire, upholstery grade. Trial lots of Springkote Wire were used by some of our customers, resulting in the enthusiastic word-for-word reactions above. Incidentally, the trial lots have been extended into production lots.

Roebling Springkote Wire paints better, bakes better and stress-relieves more evenly than whatever you're using now. (This last is *our* word-for-word reaction.)

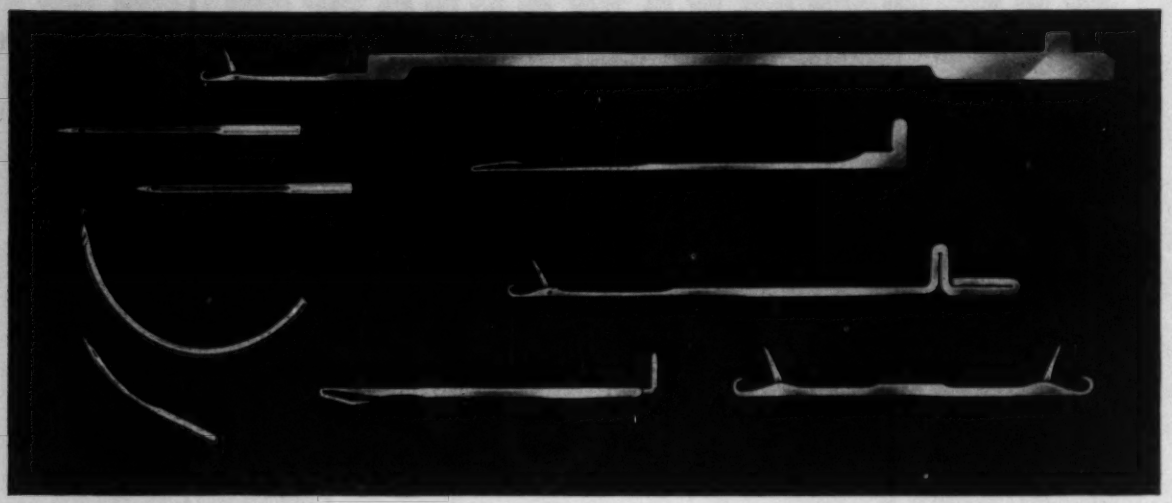
We almost forgot to tell you that Roebling Springkote Wire costs no more than wire with the standard lime coat, which we will still supply to those who want it.

For more about Roebling Springkote Wire, write Wire and Cold Rolled Steel Products, John A. Roebling's Sons Division, Trenton 2, N. J.

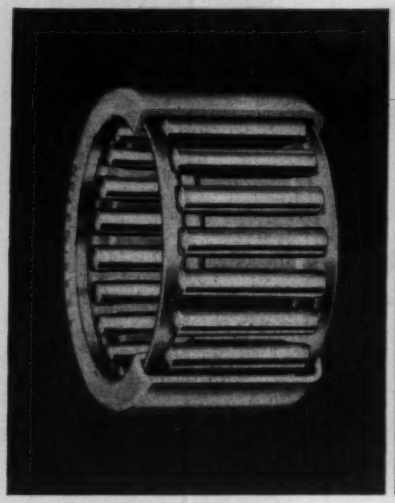
ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

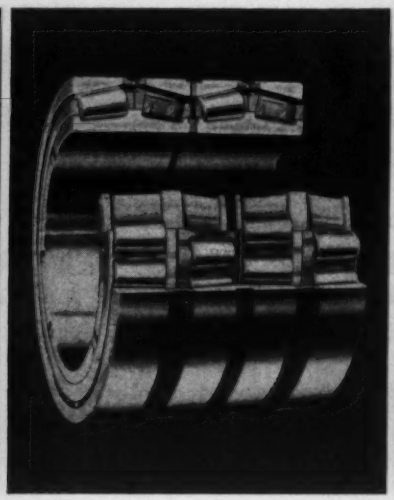
YES, TORRINGTON IS AMERICA'S LARGEST PRODUCER OF KNITTING AND SEWING MACHINE NEEDLES...



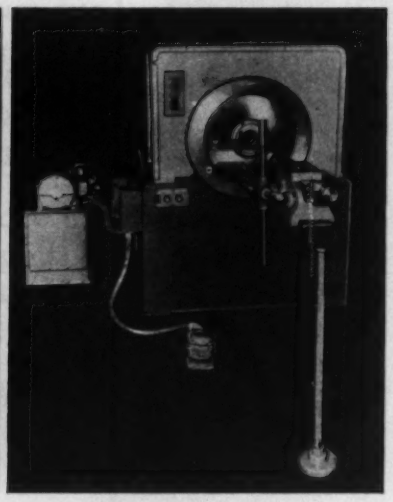
BUT THIS, TOO, IS TORRINGTON...



Pioneer manufacturer of the new Drawn Cup Roller Bearing for simplified design and increased efficiency of appliance motors, generators, and many other products.



A leading producer of 4-row tapered roller bearings specifically designed and engineered for heavy duty applications in steel, aluminum and other metal rolling mill equipment.



World's largest manufacturer of rotary swaging machines for economical chipless machining, newest of which is the versatile Electro-Hydraulic Die Closing Swager shown here.

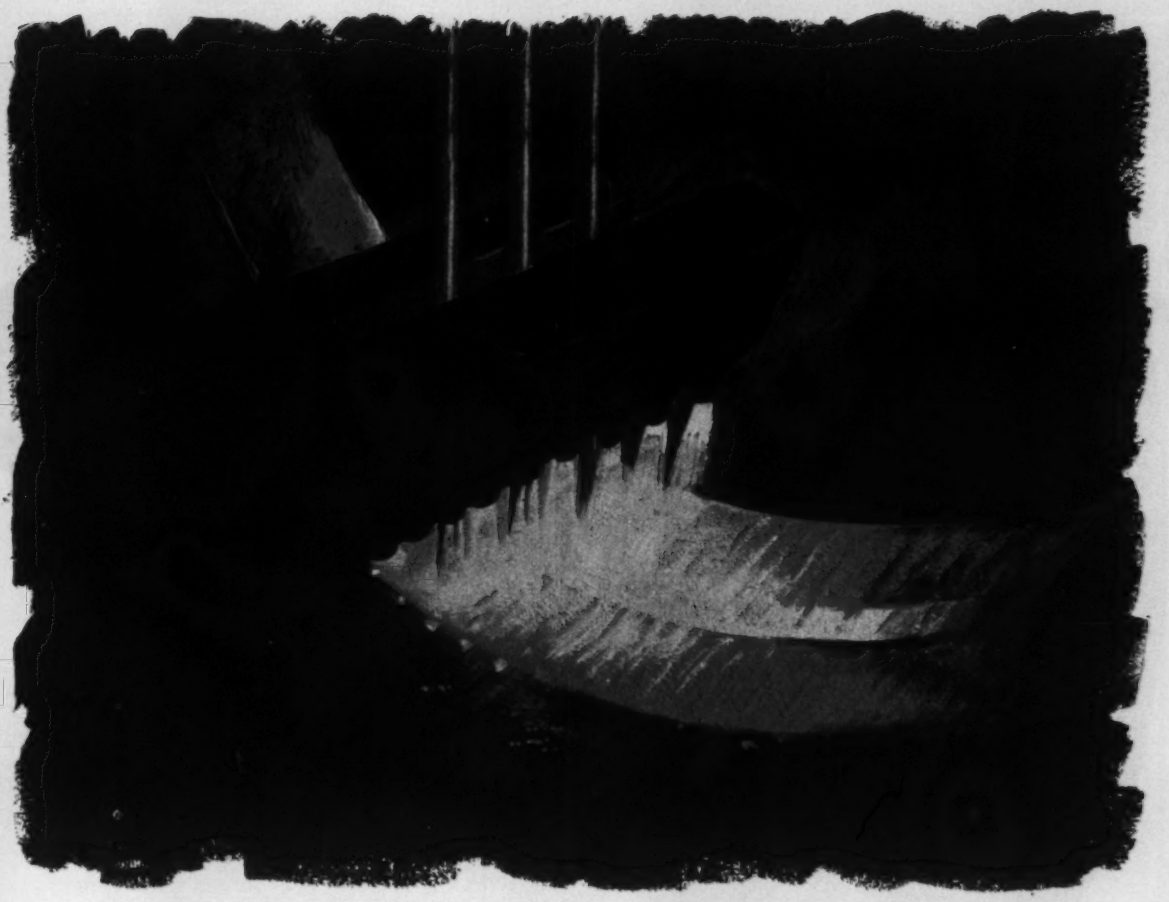
In these and many other fields throughout the world Torrington is contributing to

PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Connecticut

Serving industry from plants located in the United States, Canada, England, Germany and Italy



Lower costs with mechanized hard-facing

Speed up the hard-facing operations in your plant with HAYNES Hard-Facing Machines . . . and enjoy substantial savings. Mechanized hard-facing is fast. It produces sound, uniform deposits on a production basis. And it requires less alloy per part hard-faced.

Mechanized deposits conform closely to specified requirements. As a result there are fewer rejects. The machines maintain adequate preheat, proper proportioning of welding flames, and a continuous supply of molten metal. Gas consumption per part is lower. A minimum of manual effort is needed to turn out high-quality hard-faced parts.

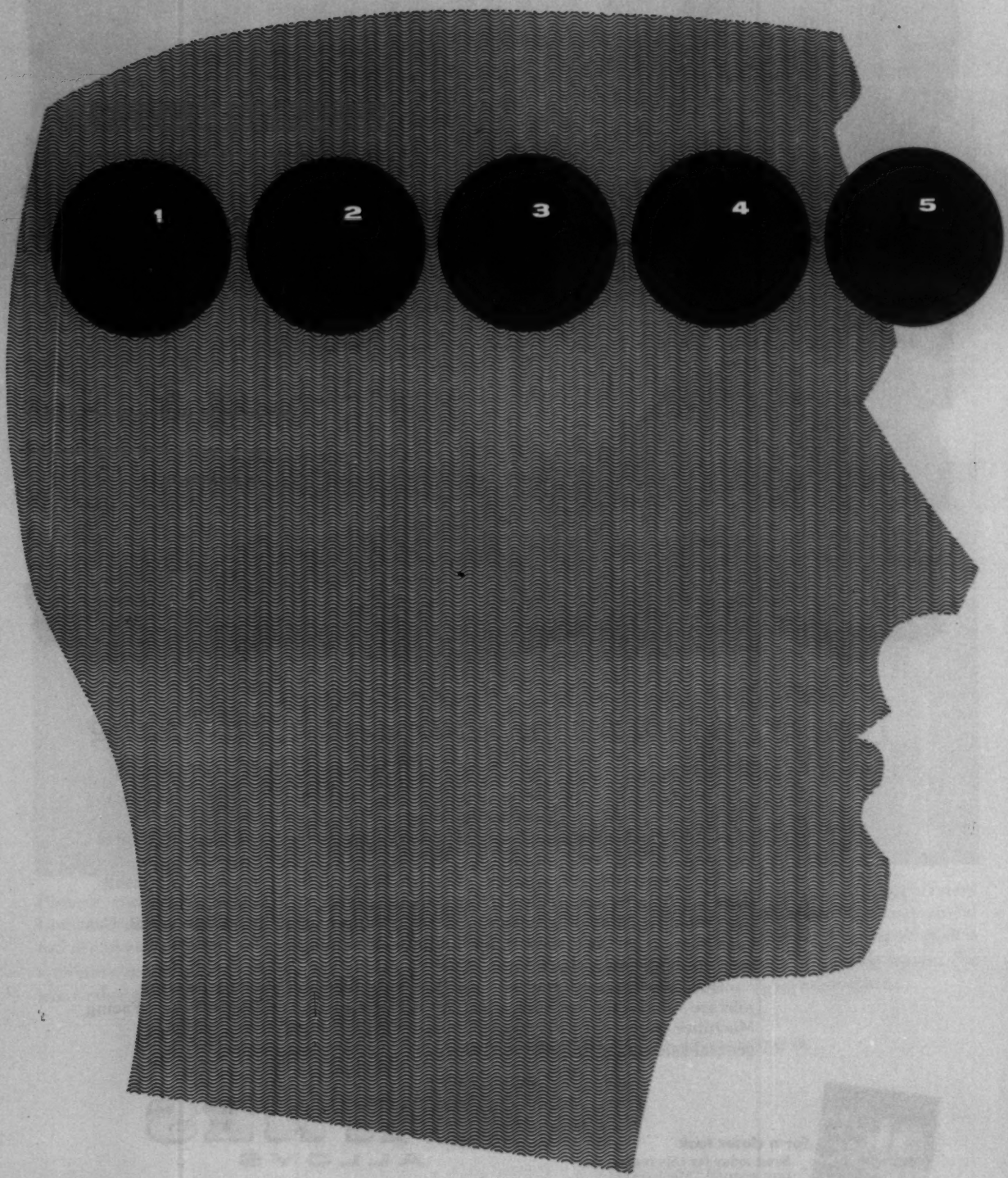
Our field engineers can help you determine which of your hard-facing jobs are suitable for mechanization. For full information on HAYNES Hard-Facing Machines and on the wide range of HAYNES Hard-Facing Alloys, write our general sales office in Kokomo, Indiana.

For a closer look
Send today for this important manual, "Mechanized Hard-Facing." Find out more about this production method.

HAYNES
ALLOYS
HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

UNION CARBIDE

The terms "Haynes" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.


1
2
3
4
5

count to ten . . .

and then

scream

That shipment of high temperature alloys hits your receiving dock. Everything goes great. No production headaches. No kicks from the field. Your wife looks several years younger and the dog doesn't growl at you any more.

You reorder from the same company. Still no problems . . . except you can't stop smiling while you shave. All told, you get nine separate shipments from this source. You're beginning to think high temperature alloy problems are the fantasies of fools.

So you place order number ten. Same supplier. Same grade. Same everything . . . except *this* lot fails to get by the eagle eye of your inspector. You've got a real procurement problem. Schedules suffer. Now your wife looks twenty years older and the dog snaps at your heels and you would trade your favorite putter for a high temperature alloy you can count on.

Carpenter hasn't come up with a cure for all your woes, but we have perfected a revolutionary new steelmaking process which minimizes variations from lot to lot. Called the MEL-TROL® process, it features a patented mold which reduces segregation of harmful impurities during solidification of the ingot. Result: you get clean, sound, tough metal from surface to centerline . . . in every bar . . . every time you order.

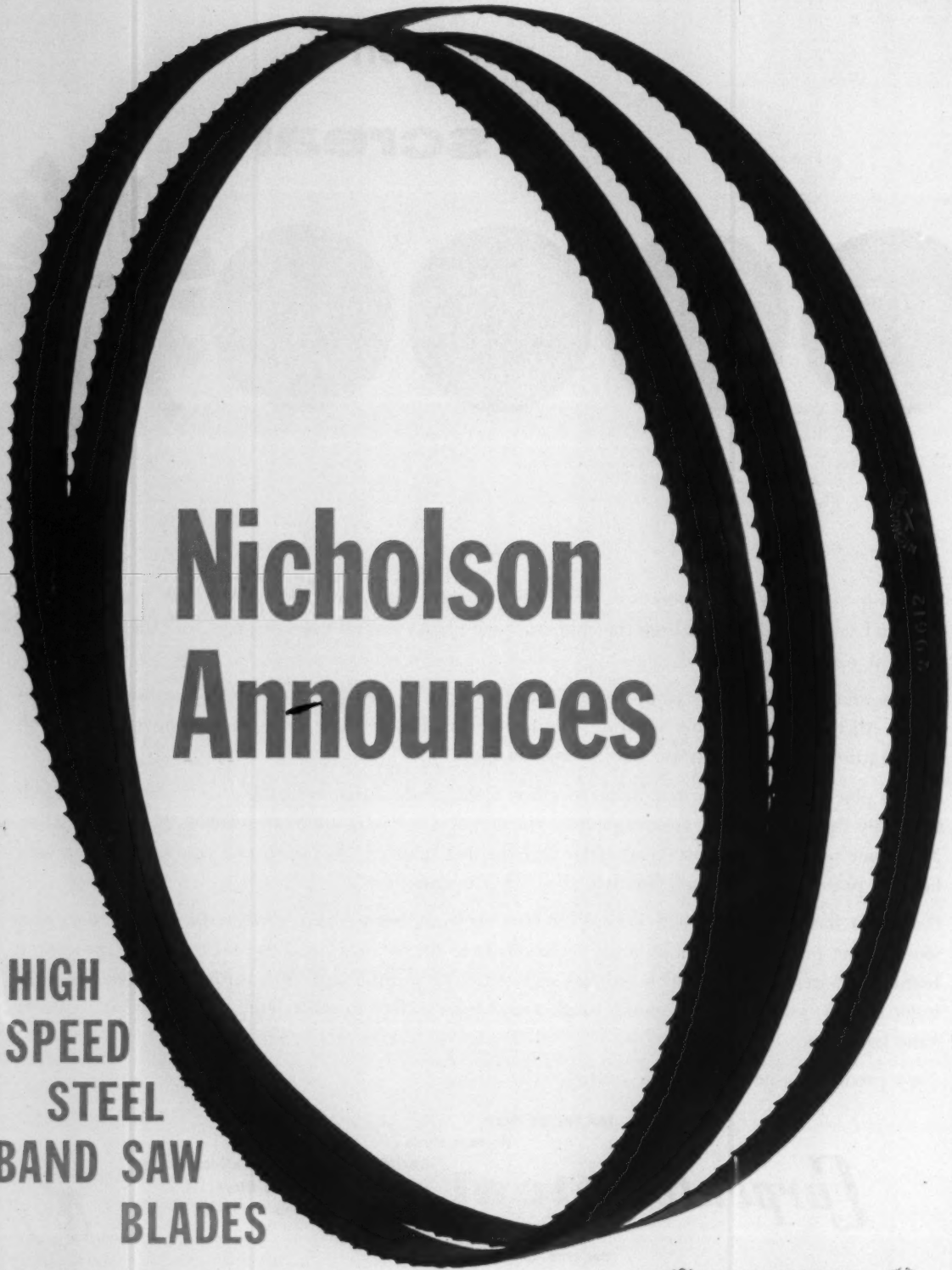
Now predictable performance is yours for the asking.

tool and die steels
stainless steels
electronic, magnetic and electrical alloys
high temperature alloys
special-purpose steels
tubing and pipe
fine wire specialties

Carpenter steel

a new company 70 years old

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.



Nicholson Announces

HIGH SPEED STEEL BAND SAW BLADES

Now, after extensive research, we have developed a High Speed Steel Band Saw blade worthy of our respected trademark. It's an extra long wearing blade for high speed production. It's now offered by selected Industrial Distributors. Ask your distributor salesman about it.* ***Our products are sold exclusively through Industrial Distributors. They offer the finest goods and services in the least possible time.***

NICHOLSON U.S.A. **NICHOLSON** BLACK DIAMOND U.S.A.

Nicholson File Co., Providence 1, R.I.
Files • Rotary Burs • Hacksaw and Band Saw Blades • Ground Flat Stock • Industrial Hammers

Another example of National Roll quality control

"Easy" Esary, left, National sales representative and Larry Weaver, iron foundry supervisor, discuss a double-pour operation at National's Avonmore plant.

Double-pouring gives longer roll life

Double-pouring is a foundry technique in which a special, high hardness iron is poured first and allowed to form the outer roll shell; then a low alloy cast iron is poured, displacing the still-molten special composition iron to form a shock-resistant roll core and more easily machined necks.

Apart from the interesting, precise foundry procedures, double-poured National NN Nickel Iron Rolls have real advantages to roll users—high surface hardness needed for certain applications, plus a tough, resilient core that stands up in hard service.

National Roll's only business is rolls; steel, iron and nodular iron. That's why we have developed a team of metallurgy and production experts that is outstanding for its experience and the service it can render to roll users.

Much of the National story is told in a new brochure that soon will be off the press. Write for a copy. It helps explain why . . .

National's the growing name in rolls

NATIONAL ROLL & FOUNDRY DIVISION

GENERAL STEEL CASTINGS CORPORATION, Avonmore (Westmoreland County), Pa.

General Steel Castings Corporation, General Offices: Granite City, Illinois • Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.

NORTHERN Cranes for production

Repeated selection of Northern Overhead Electric Traveling Cranes in high production plants is evidence of their dependability in providing long-term, low-cost, heavy duty service—fast, accurate operating control—minimum downtime for maintenance—maximum safety—and three-shift service seven days per week when required. For additional information call your nearby Northern representative, or write or call Northern's main office.

These four Northern Cranes, each of 25-ton capacity (with 10-ton auxiliary hooks) and 116-foot span, are operating in a large, integrated automotive press plant. Each crane has 8-wheel compensating end trucks, full length footwalks on both girders, and rotating steel handling equipment.

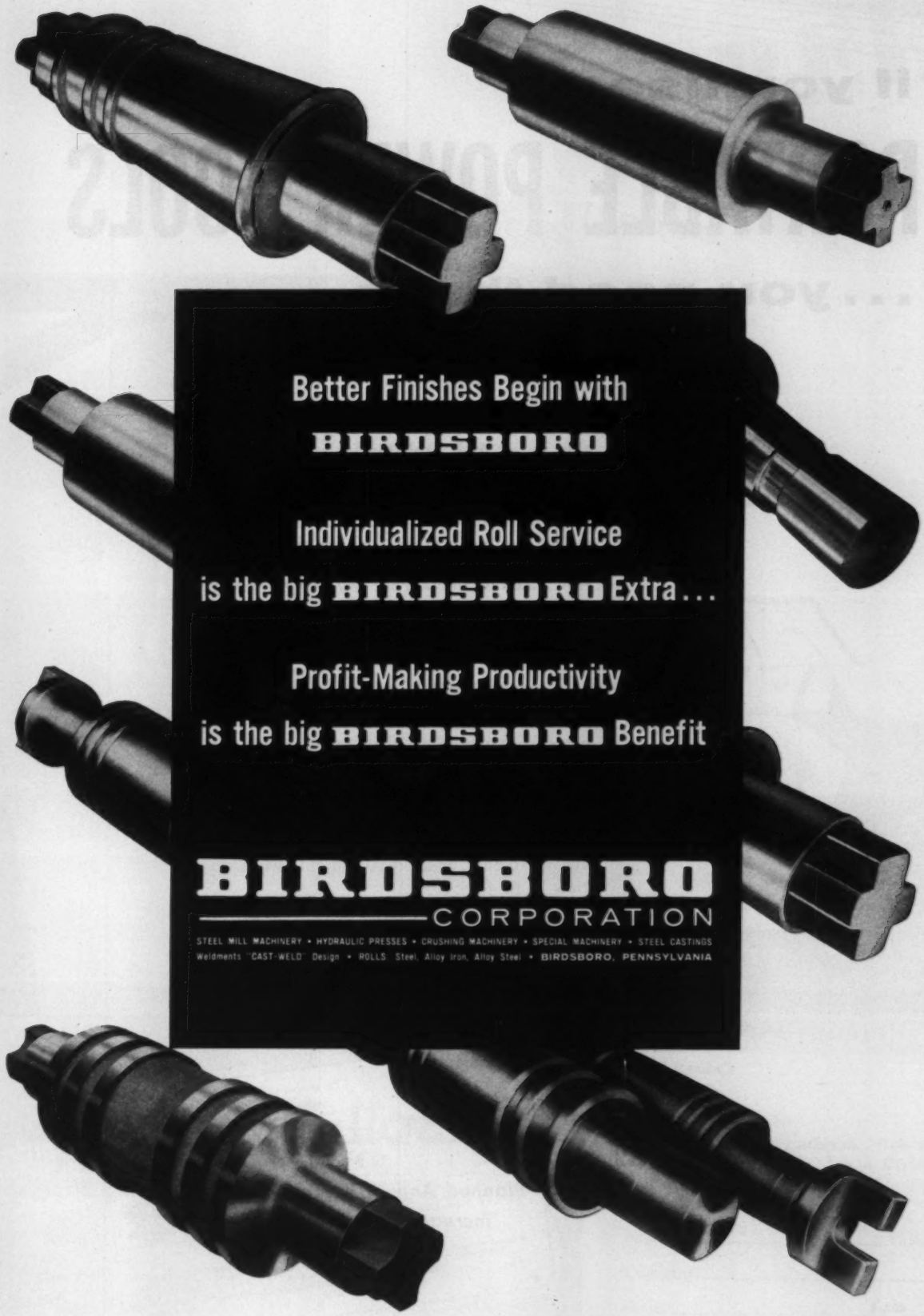
MATERIAL HANDLING EQUIPMENT BY **NORTHERN**

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

SE-2035

Sales representatives in all principal cities.

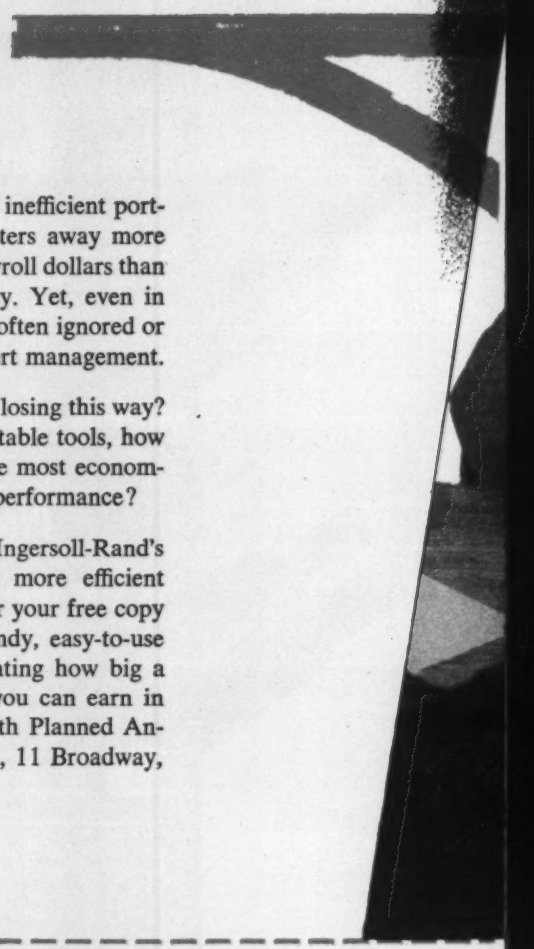
look overhead . . . see "NORTHERN"


Better Finishes Begin with
BIRDSBORO
Individualized Roll Service
is the big BIRDSBORO Extra...
Profit-Making Productivity
is the big BIRDSBORO Benefit
BIRDSBORO
CORPORATION
STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS
Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel • BIRDSBORO, PENNSYLVANIA

if you use

PORTABLE POWER TOOLS

...you need these



Studies show that operation of inefficient portable power tools probably fritters away more production . . . wastes more payroll dollars than anything else in industry today. Yet, even in the best-run plants, this fact is often ignored or overlooked by an otherwise-alert management.

How much production are *you* losing this way? Just how efficient are your portable tools, how do you find out, and what's the most economical way to keep them at peak performance?

You can get all the answers in Ingersoll-Rand's new illustrated guidebook to more efficient power tool operation. Write for your free copy today! With it you'll get a handy, easy-to-use *Dividend Computer* for estimating how big a Dividend on Payroll Dollars you can earn in your plant in just one year with Planned Annual Retooling. Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

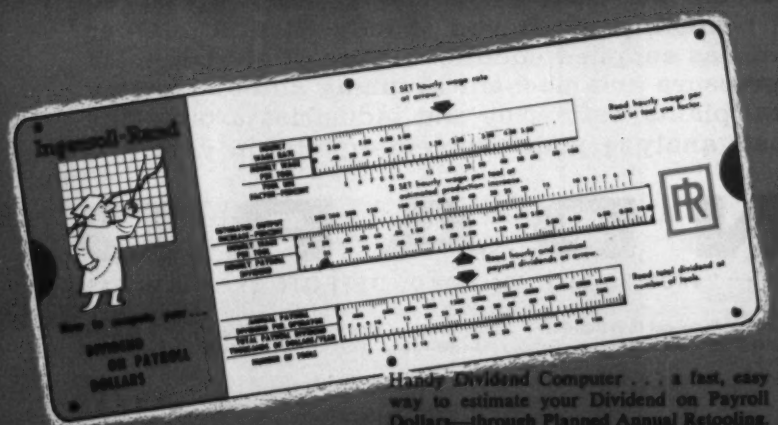
Ingersoll-Rand

11 Broadway New York 4, N. Y.

Planned Annual Retooling increases output per man

40A-8

FREE
how Planned
Annual
Retooling
earns you a dividend on payroll dollars



Handy Dividend Computer . . . a fast, easy way to estimate your Dividend on Payroll Dollars—through Planned Annual Retooling.

MAIL COUPON TODAY!

Ingersoll-Rand Co.
11 Broadway
New York 4, N. Y.

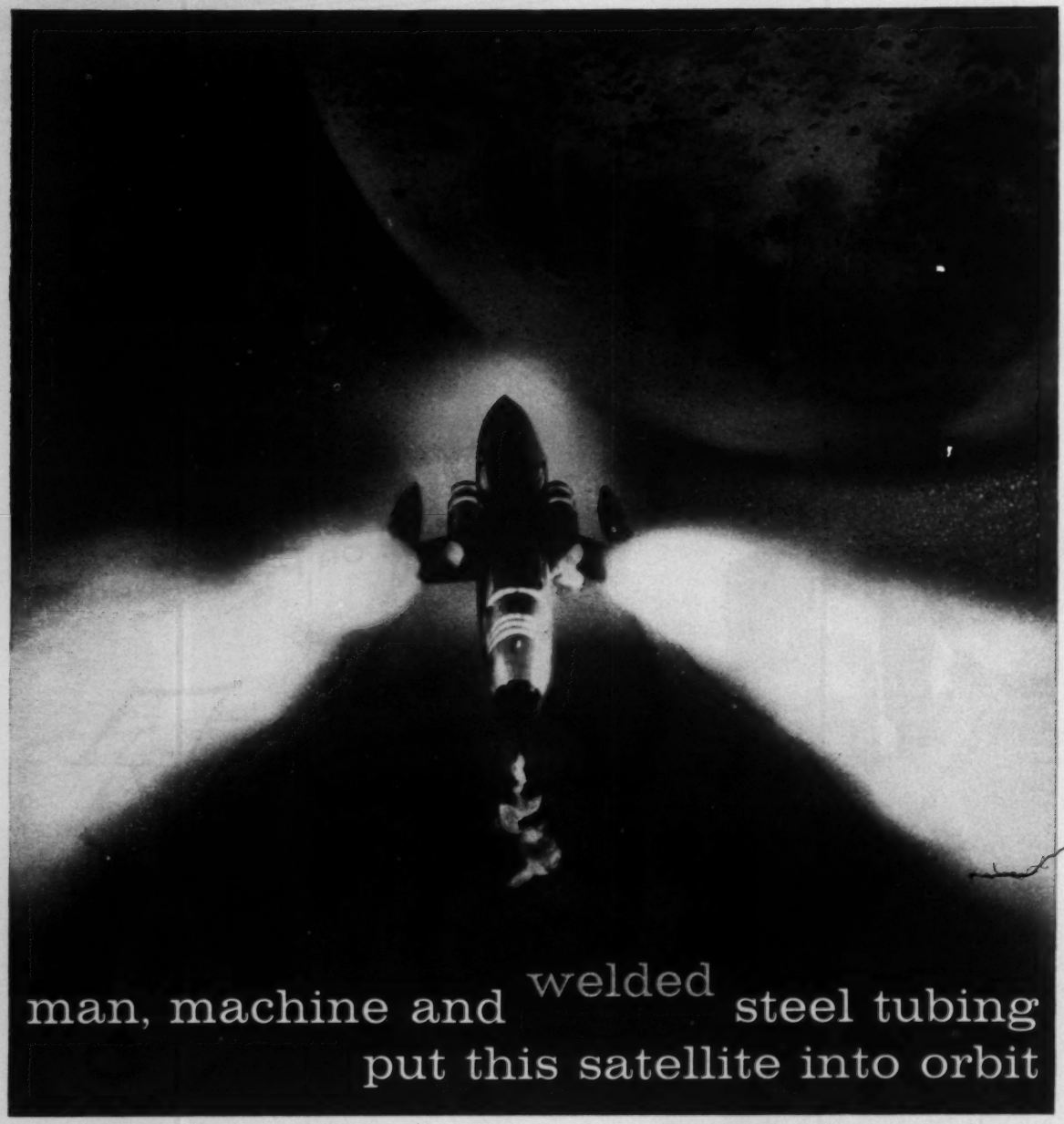
Send a copy of new guidebook *"How Planned Annual Retooling Earns You a Dividend on Payroll Dollars"* and a *Dividend Computer* to:

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____



man, machine and welded steel tubing
put this satellite into orbit

You who are responsible for the purchase of tubular goods are assured highest quality and product reliability when you specify Standard. Over the past forty years Standard has supplied countless miles of electric weld boiler and heat exchanger, pressure and mechanical tubing and oil country tubing and casing to chemical plants, refineries and industries around the world. Let Standard specialists analyze your problem—quote on your job.

STANDARD

THE STANDARD TUBE COMPANY • 24400 PLYMOUTH ROAD, DETROIT 39, MICHIGAN

Welded stainless tubing and pipe • Welded carbon steel mechanical • Boiler and Heat Exchanger • Exclusive rigidized patterns • Special Shapes • Oil Well Tubing and Casing • Light Weight Pipe • Steel Tubing—Sizes: ½" OD to 6" OD—.028 to .270 wall • Stainless Pipe and Tubing—Sizes ¼" OD to 4¼" OD—.020 to .187 wall.

Whether furnace output is measured in grams or tons, Hevi-Duty's value solution pays steady operating dividends.

When you consult a Hevi-Duty Sales Engineer on any heat-processing problem, you take three important steps toward a sound solution. For Hevi-Duty helps you three ways:

Designs the system to fit your need. A Hevi-Duty Applications Engineer works full time on such problems. Call on him. He might save you countless hours. He may have solved a problem like yours last week.

Designs the furnace to fit the system. Usually, the unit you need will be a proven item, for you are drawing from the most complete line of heat-processing equipment in the business. If not, Hevi-Duty engineers can quickly design the unit that fits your needs exactly.

Builds the furnace to last. Hevi-Duty furnaces are built for tough, continuous production work. They are designed to last, and hundreds of case histories prove they do.

Here are three typical examples of non-ferrous melting furnaces spanning a wide range of sizes, yet each provides the value solution to a problem.

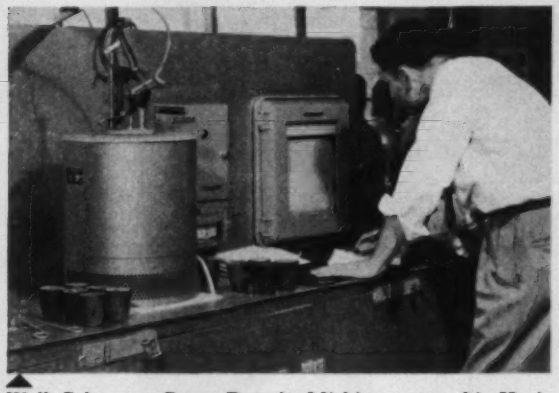
HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

B P C

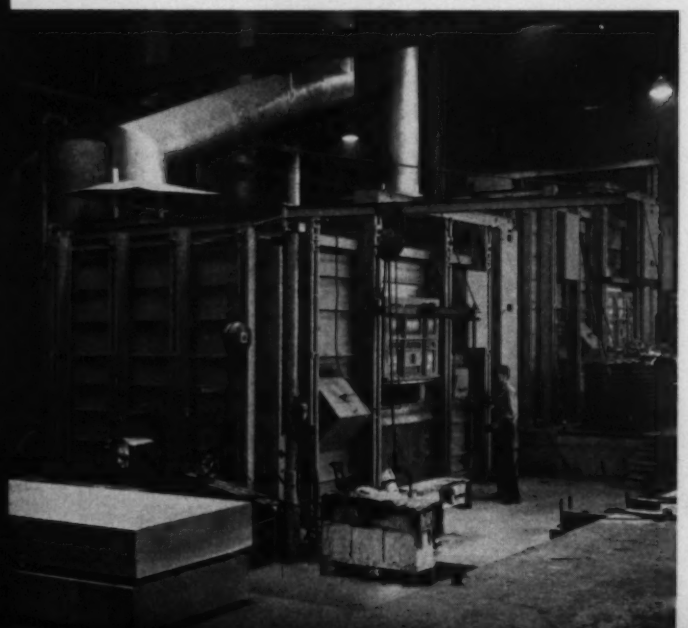
A Division of Basic Products Corporation

Hevi-Duty Electric Company, Milwaukee 1, Wis.



Wall Colmonoy Corp., Detroit, Michigan, uses this Hevi-Duty laboratory crucible furnace to find exact melting temperatures of hard-surfacing and brazing alloys. Furnace heats rapidly to the 2200° F. temperature required, provides precise control for melting and cooling tests on 250 g samples. User reports long element life at high temperatures. ***For more information, send for Bulletin 1246.***

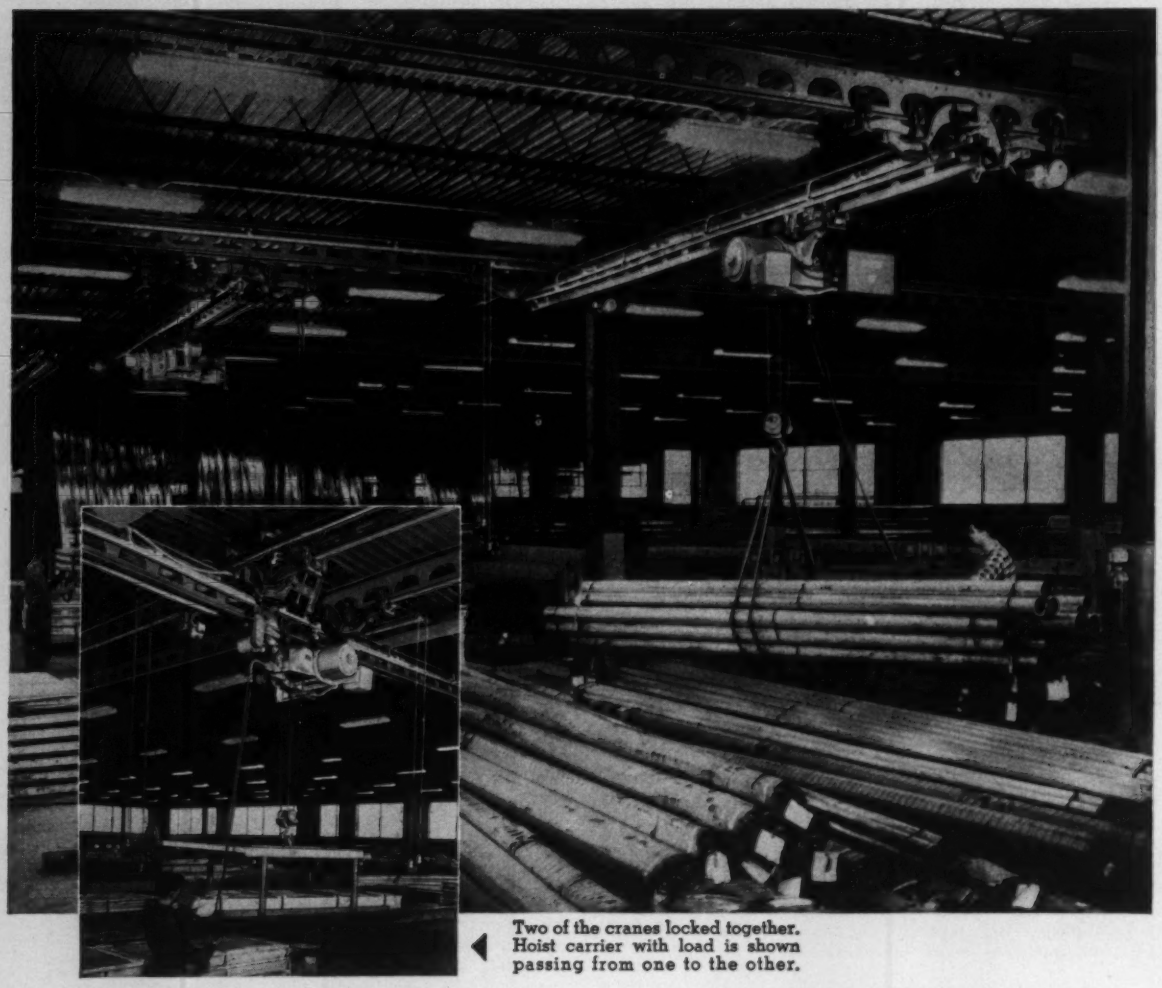
This Hevi-Duty double-chamber, dry-hearth furnace melts 100 lb of aluminum per hour, 16 hours a day, 7 days a week at Alliance Mfg. Co., Alliance, Ohio. It can provide up to 200-lb-per-hour output and occupies little space. It maintains critical bath temperatures during charging. User states: "You can turn it on and forget about it." ***For complete information, send for Bulletin 593.***



Kawneer Company, St. Charles, Illinois, has installed a second pair of Hevi-Duty reverberatory furnaces for breakdown and holding in direct-chill ingot casting of four different alloys. Furnaces provide ± 10° F. control, pour at 1320° F., operate 24 hours a day. Capacity is 100,000 lb a day. Note in the foreground two of the 6,300-lb aluminum ingots produced. ***Please write for Bulletin 591.***

Large bundles of pipe, sheets, etc., are quickly handled from receiving dock to any spot in the warehouse *without rehandling* by the overhead Cleveland Tramrail transfer cranes. Whitehead Metal Products Co., Inc. specialize in a wide variety of nonferrous metals.

TRAMRAIL CRANES
SAVE WAREHOUSE SPACE
Improve Materials Handling Efficiency



Two of the cranes locked together. Hoist carrier with load is shown passing from one to the other.

In the large modern warehouse of Whitehead Metal Products Co., Inc., Cambridge, Mass., the entire job of unloading incoming materials, placing in storage and handling for outgoing shipments is done with Cleveland Tramrail transfer cranes.

The cranes have proven most practical for this service. They can transport long, unwieldy bundles of pipe in much narrower aisleways and turn them ninety degrees for piling without need of wide turnaround areas. As a result, an important amount of floor space is saved, and this provides considerable additional storage capacity.

Three cranes on separate, adjacent runways are used at Whitehead. However, there are only two hoist carriers, one of two tons, and the other of three tons capacity. Either can be transferred to any crane. The equipment is completely motorized, push-button operated. Conductors are SAFPOWRBAR. (SAFPOWRBAR electrification has been approved by the Underwriters Laboratories, Inc. and the Canadian Standards Association.)

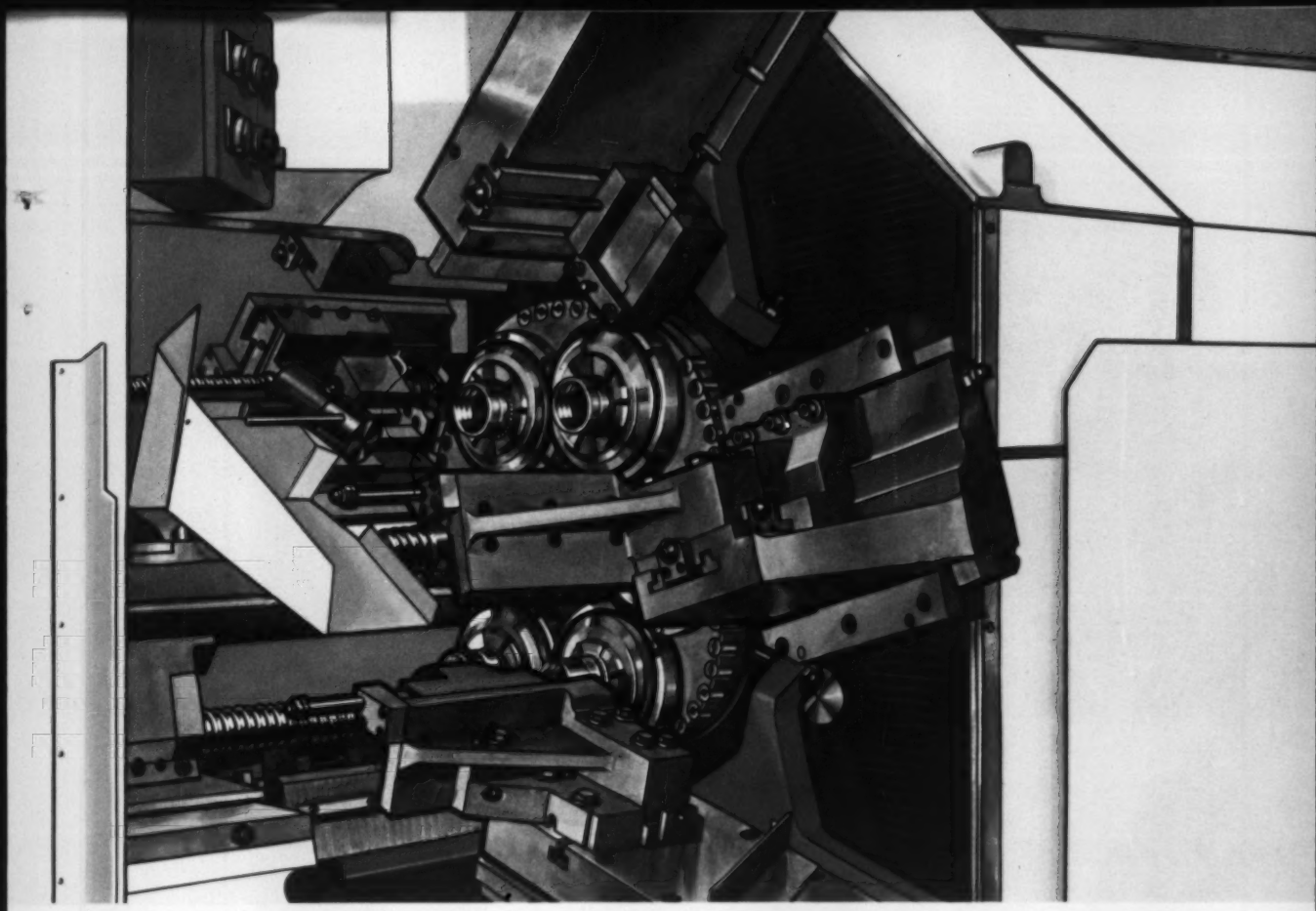
Hundreds of warehouses handling materials of nearly every kind are profiting by installations of safe, dependable, time-saving Cleveland Tramrail cranes and track systems.

Write for free Engineering and Application Booklet No. 2008. Packed with valuable information.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7845 E. 290 ST. • WICKLIFFE, OHIO



New, large capacity New Britain bar machines

If you feel you know New Britain bar machines like a book, a word of caution: There's a completely new book! New, basic design that removes limitations formerly inherent in bar machine construction. New power, new speed, completely new capability for imaginative tooling.

And new, large bar capacity. That is the important "new" we want to call to your particular attention here. You can apply New Britain standards of productivity to bar stock as large as 5⅛".

The new, big line of four-, six-, and eight-spindle models:

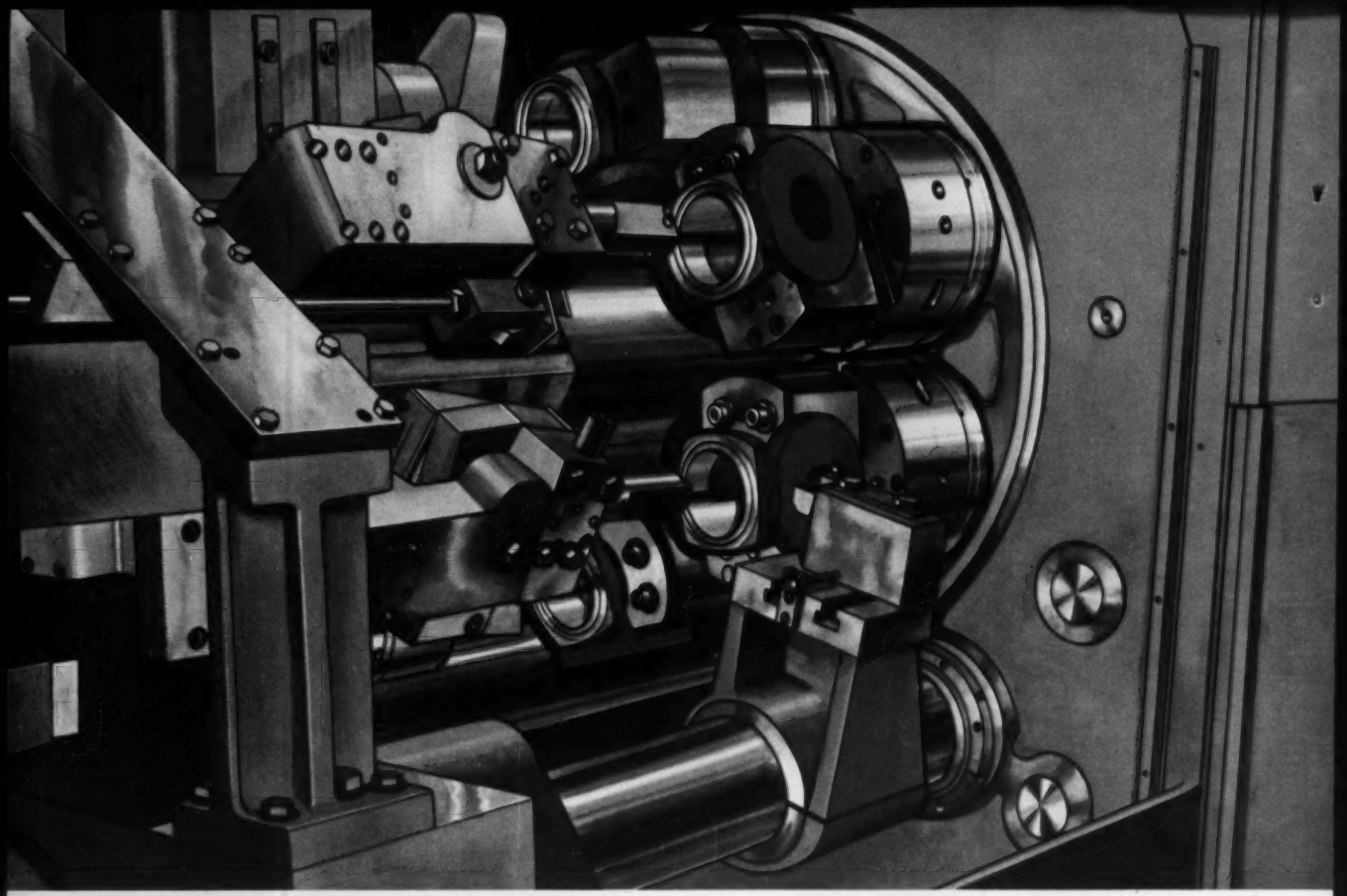
Model 450. Four spindles, 5⅛" maximum capacity, four independently operated radial cross slides.

Model 635. Six spindles, 3½" capacity, with independent radial cross slide in every position.

Model 826. Eight spindles, 2⅝" capacity. Six independently operated cross slides with the two lower slides exceptionally wide to provide elevating blocks for cross slide tooling in the number 3 and 8 positions.

Inexpensive, disc-type cams provide positive actuation of cross slides. Cross slide and end-working tools on all models are easily accessible. All models have positive spindle carrier lifting, locating and locking. New catalog material will give you further details on these machines. Your New Britain representative can show you how the increased profitability built into them can improve your competitive situation. Plan to see him soon.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division · New Britain, Connecticut



Capacity up to 15″ on New Britain chuckers

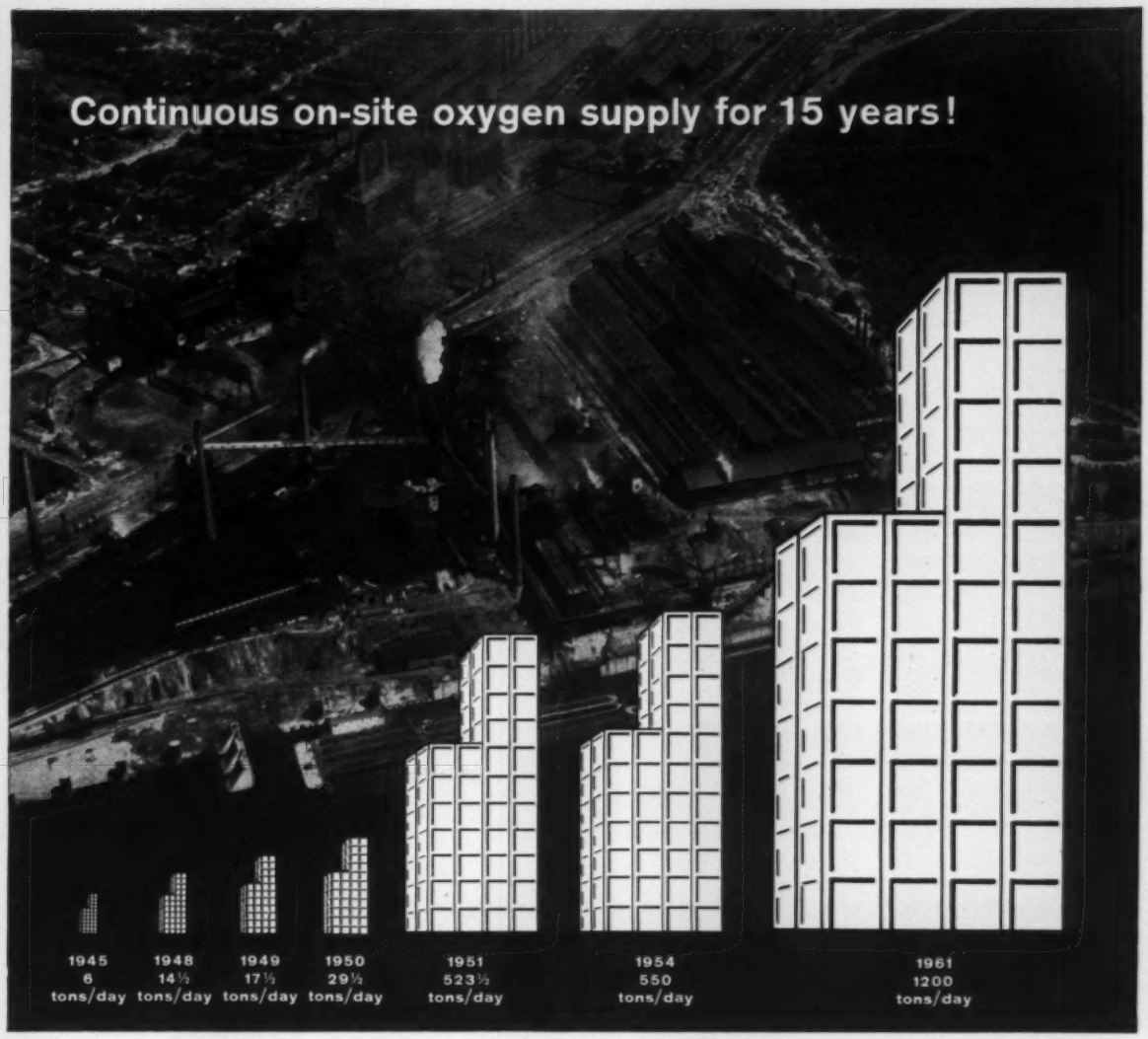
We are going to take it for granted that *you* take New Britain chuckers for granted—as the leading make of multiple spindle automatics. Most people do. The big news then is that the profitability of these famous machine tools can now be applied to an increased range of work. The new New Britains are available with chucking capacities up to 15″, which enables you to apply New Britain standards of speed, accuracy and versatility to larger work.

The 15″ capacity applies to four-spindle models. Six-spindle machines will take pieces up to 12″, and eight-spindle chuckers will handle up to 10″.

If you work with large castings and forgings, this might be the announcement of the decade, in terms of an investment that can't fail to be profitable. With equipment like this properly adapted to your particular requirements, nobody, anywhere, is going to trim you on cost per piece.

Call on your New Britain sales engineer for practical, specific information, of course. Meanwhile, we have just published a new catalog on these new large capacity chuckers, and we would be happy to mail your copy to you on request. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Conn.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division · New Britain, Connecticut



AGAIN! Weirton Steel calls on Air Products for reliable, low-cost oxygen

Air Products is now designing, building and installing a new on-site oxygen plant to meet expanded needs at Weirton Steel Company, a division of National Steel Corporation. The new facility will add 650 tons per day to Weirton's capacity, bringing it to 1200 tons per day. One of the first mills to take advantage of "on-location" oxygen generation, Weirton has long enjoyed the benefits of dependable, flexible, low-cost supply... puts oxygen profitably to work in many ways, including scarfing, blast furnace air enrichment, open hearth combustion and open hearth roof lancing.

Progressive steel companies across the nation have found Air Products on-site oxygen generators the key to making iron and steel faster at lower cost. Air Products long experience in supplying oxygen to the steel industry . . . plus continuous application research by our technical service department . . . assures practical, properly-sized plants and facilities tailored to the individual operating conditions, usage rates and future requirements of each mill. May we help *you* put oxygen to work? Air Products, Inc., Allentown, Pa.

Air Products
...INCORPORATED

STEEL

STEEL pipe is a way to carry things. Gas, water, chemicals, oil. Wires, cords, cables, voices . . . these and a thousand others. Steel is pipe laid deep in the earth. A connection through the air between two points. Sometimes you see it, more often you don't. Youngstown, world's second largest pipe producer, makes tubular goods in virtually hundreds of sizes and strengths. Pipe to carry things. Pipe to protect, pipe to build with. Pipe ringed by the Orange Bands of Youngstown, pipe from a growing force in steel.

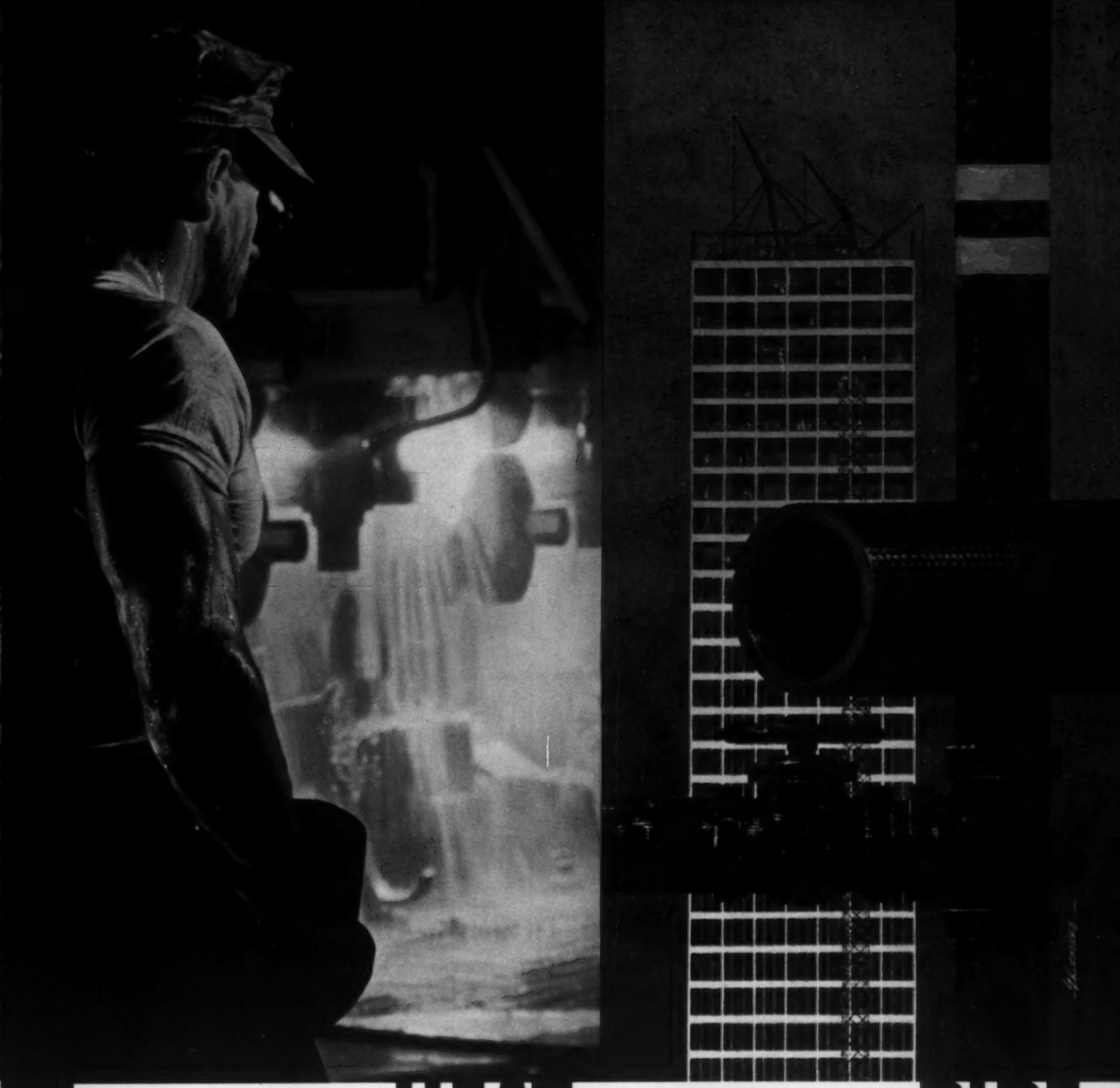
OIL

STEEL is pipe for drilling 1000 oil wells a week. It is casing and tubing. In the oil fields, there is no more widely known mark of quality than the Orange Bands of Youngstown. Through its Continental-Emsco supply division, Youngstown offers a drilling equipment source second to none. Through its modern tubular research center and through its engineers (largest service group in the oil fields), Youngstown offers help to solve your problems. You get satisfaction from Youngstown, a growing force in steel.

Youngstown –

THE YOUNGSTOWN SHEET AND TUBE COMPANY, YOUNGSTOWN, OHIO.

ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND COLUMBUS DALLAS DENVER DES MOINES DETROIT



HEAT PIPE

YOUNGSTOWN STEEL is seamless pipe for drilling oil. Continuous weld pipe for plumbing, heating and construction. It is electric weld pipe for transmission and distribution of gas and water. It is Youngstown's automated seamless mill rotary hearth, largest in the world. It is Youngstown's Campbell reduction mill stretching 7-inch OD pipe thirty feet long into 2-inch tubing one hundred and forty feet long. It is quality. It is service. Two well-known traditions which mark Youngstown as a growing force in steel.

YOUNGSTOWN STEEL is all kinds of pipe. It is pipe of carbon steel and Yoloy. It is Fibercast—plastic pipe to handle corrosive liquids at high temperatures. And you can get it through 28 Youngstown District Offices, 750 standard pipe distributors, 16 independent oil country suppliers and 153 Continental-Emsco stores and offices. Whatever your needs, wherever you are, name Youngstown pipe when you want quality and cost-cutting service. You get what you want from Youngstown, a growing force in steel.

growing force in steel

GRAND RAPIDS HOUSTON INDIANAPOLIS KANSAS CITY LOS ANGELES MILWAUKEE MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS SAN FRANCISCO SEATTLE TULSA WASHINGTON

18 lbs. of stainless per ring eliminated by flash butt-welding extruded sections

Amweld experience in forming and flash butt-welding rings from extruded sections reduced the cost of $52.00 rings to $21.00 each. A special section closely approximating the cross-section of the finished part was selected to replace heavy rectangular bar stock. By leaving over 12,000 lbs. at the mill, the cost of these rings was reduced by 40%—not to mention large savings in machining time.

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and machining facilities, phone or write.

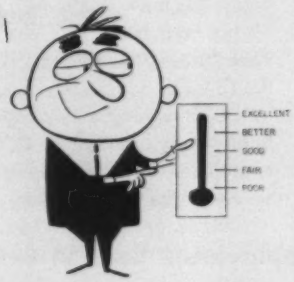
GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

PAs See Better Business Climate Ahead



The latest survey of members by the National Association of Purchasing Agents reveals: 47 per cent say 1960 business has equaled or exceeded their expectations; 53 per cent say it has not . . . 47 per cent believe second half business will exceed that of the first; 14 per cent look for a decline . . . 36 per cent will reduce inventories; 6 per cent will build them.

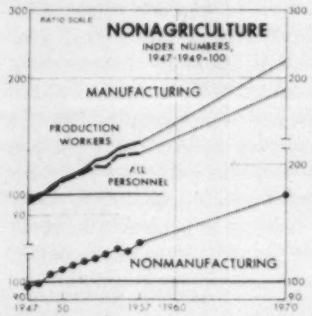
Personnel Tests: Help or Hindrance?

"Personnel tests are booby traps," asserts Lon D. Barton, president, Cadillac Associates Inc., Chicago. "So far as I know, no test has yet been devised which can give a potential employer the answer to 'Should I hire this man?' or 'If I hire him, will he work?' . . . There is no substitute for personal appraisal of a man and a careful check of his work references. What he has done for another organization is the best indicator of what he can do for a new employer," says Mr. Barton.

April Sales Lag in Many Segments as Spendable Earnings Drop

April sales of vacuum cleaners fell 12.3 per cent below the April, 1959, mark, reports the Vacuum Cleaner Manufacturers Association . . . April shipments of gas ranges declined 4.7 per cent from the year-earlier mark, says the Gas Appliance Manufacturers Association . . . The Industrial Fastener Institute's index of shipments fell to 95 in April from 114 in March . . . April orders for furniture slipped 6 per cent below the year-earlier total, says National Association of Furniture Manufacturers. The Labor Department says net spendable earnings of factory workers fell 1 per cent in April to $80.20 per week for a worker with three dependents.

R&D Spending to Soar



"The base for a vigorous technological advance is now being forged in the research and development facilities of private industry as well as government, universities, and nonprofit institutions," reports Martin R. Gainsbrugh, chief economist, National Industrial Conference Board. He said at a NICB meeting: We're now spending $12 billion a year for technological research and the figure could more than double by 1970 (see chart).

Industrial Distributors Expect Good Year

Industrial distributors see 1960, not as a boom year, but as a "good business year." Meeting in Chicago, they foresee a stable third quarter (despite the

Technical Outlook—Page 97 Market Outlook—Page 133

usual seasonal adjustments) and believe the fourth quarter will be better than the third. First quarter reports from the Eastern and Central states show sales increases of 15 to 25 per cent this year vs. last, says W. H. Campbell, president, National Industrial Distributors' Association, but a leveling off is being felt now. In the Mountain states and on the Pacific Coast, sales are 5 to 10 per cent below last year's. L. D. Montague, president, Southern Industrial Distributors' Association, says construction seems headed for new gains in the South and Southwest; backlogs are good; there has been no letup in inquiries involving major capital expenditures. Observes Fred C. Emerson, president, American Supply & Machinery Manufacturers' Association: If there is confidence after November's elections, at least the first half of 1961 should be fractionally better than the like 1960 period.

Employment Lags in Bellwether Ohio

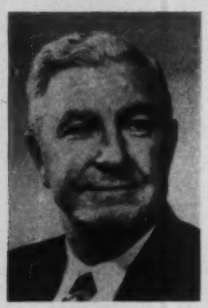
Ohio, a bellwether business state for metalworking because of its diverse industrial makeup, is failing to show a spring upturn in employment, indicates a new study by the Bureau of Business Research, Ohio State University. Here is the pattern (showing percentage changes):

	Apr. vs. March	Apr., '60 vs. Apr., 1959		Apr. vs. March	Apr., '60 vs. Apr., 1959
All industry	..	+1	Rubber products	−6	−5
All manufacturing	−3	−1	Stone, clay & glass	−1	−2
Chemicals	+4	+4	Vehicles	−6	−6
Machinery	−3	+6	Construction	+36	+7
Metal products	−6	−4	Trade, service, utilities	+2	+4

Computers to Make Tenfold Progress in Process Control

"The next decade will see ten times as much progress in applying computers to control factory processes as was seen during the last ten years," Dr. Arthur S. Robinson, Eclipse-Pioneer Div., Bendix Aviation Corp., told an audience at the Design Engineering Show.

Ten Commandments of Communications—Republic's Patton



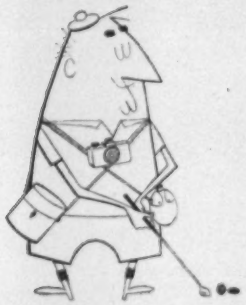
T. F. Patton, president, Republic Steel Corp., gave these commandments at a meeting of the American Iron & Steel Institute: 1. Communications is the job of every manager. 2. Seek to improve communications every day. 3. Don't underestimate employees' intelligence or desire to be loyal to the company. 4. Accept the union as a fact of life. 5. Seek to understand employees' fears and aspirations. 6. Promote public understanding of your policies and problems. 7. Educate employees and the public in the basic facts of economics and business practice. 8. Communicate in simple language—or you will be talking to yourself. 9. Speak with deeds that back up your words. 10. Listen as well as speak. Says Mr. Patton: The strike taught us a lesson; attitudes do not change overnight.

German Steelmaker Stresses Research

August Thyssen-Huette AG, giant West German steelmaker, has opened a modern technical center and chemical laboratory, with advanced scientific and testing equipment. "We must be more accurate and faster in our analysis

methods," says Dr. Alfred Michel, technical vice president. His firm is conducting fundamental research aimed at cutting production costs, boosting productivity, holding prices, and quality.

The Leisure Market: Growing by Hooks and Slices



The census report for 1959, released last month by the Athletic Goods Manufacturers Association, reveals 1959 sales of sporting goods rose 10 per cent above the 1958 level. Breakdown: Golf equipment—up 16 per cent; baseball and softball equipment—up 1 per cent; tennis, badminton, and related equipment—up 6 per cent; helmets and pads—up 15 per cent; athletic shoes—up 22 per cent; inflated goods—up 11 per cent. The average iron sold to golf club distributors for $5.56.

Most Companies Give Employees Travel Insurance

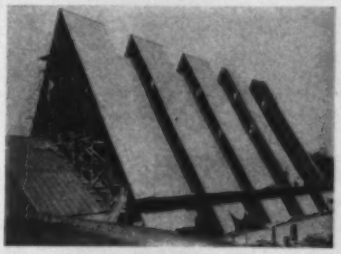
Three out of four companies now provide employees with insurance against business travel hazards (vs. 2 out of 3 in 1956), a survey by National Industrial Conference Board reveals. Even among companies that don't have a travel insurance policy now, there seems to be wide acceptance of the idea that companies should assume responsibility for the travel risks, NICB reports.

Will Florida Juicers Go to Aluminum?

Yes, says D. P. Reynolds, executive vice president-sales, Reynolds Metals Co., who predicts that Florida's entire output of orange, grapefruit, and blend frozen concentrates will be canned in aluminum within two years. Minute Maid Corp. has announced an experimental concept in canning frozen fruit concentrate: About 6.5 million aluminum cans will be assembled and packed in a single production line.

Church Roof Takes 20,000 Lb of Aluminum

Aluminum Co. of America's new batten roof will cover the 26,000 sq ft roof of St. Sebastian's Church (photo) in Pittsburgh. Available finishes include mill finish, an embossed stucco-like pattern, the 11 hues of Alumalure, green Alodine, and a low specular gloss treatment, which offers a low reflective surface.



Corporate Symbols Aren't Doing Their Job

The corporate symbols of 7 out of 10 of the largest industrial firms in the U. S. are no longer adequate for the communications job they are called upon to do, Walter P. Margulies, president, Lippincott & Margulies Inc., industrial designers, told an American Management Association seminar. Of the 100 largest U. S. industrial corporations, 75 did not meet top standards on one or more of the four basic criteria for their symbols—memorability, recog-

nition, appropriateness, and uniqueness. Among firms whose symbols got top ratings: General Electric, IBM, International Harvester, American Can, Eastman Kodak, Alcoa.

IRS Surveys Depreciation Methods

The Internal Revenue Service, in preliminary research into industry's depreciation practices, surveyed the methods used in 1957-58. The findings (in billions of dollars of depreciation claimed):

	Total	Straight line
All industries	17.1	12.0
Manufacturing	7.5	4.9
Public utilities	3.9	3.0
Trade	1.8	1.4

Car Division Head Gives First Hand Market Report

H. E. Chesebrough, general manager, Plymouth-DeSoto-Valiant Div., Chrysler Corp., back in Detroit after touring major U. S. auto market areas, reports: 1960 sales could attain the "optimistic estimates" made by the industry . . . the biggest volume cars will continue to be the standard size jobs in the low priced field; they could account for 4 out of 5 cars sold in 1961 . . . Plymouth-Valiant dealers are currently showing a 78 per cent increase in retail deliveries vs. the like '59 period . . . Multicar households have increased 67 per cent in the last five years to 8 million.

Straws in the Wind

Borg-Warner International Corp. says 750 Norge refrigerator-freezers are being shipped to England via the St. Lawrence Seaway, opening "a new British market" . . . Philco Corp. cut in half the unit price for tunnel diodes which it introduced last March . . . March exports of crude aluminum dropped to 56.3 million lb, but the total for 1960's first quarter hit 189.3 million lb—six times the year-earlier exports, says the Commerce Department . . . Miehle-Goss-Dexter Inc. says its incoming orders are at an all-time high . . . The backlog of unfilled orders for commercial steel forgings dropped to 356,248 short tons at the end of March from 398,256 a month earlier, says the Census Bureau . . . Ford of Canada is building a $6 million glass plant to make its own car windows—in time for '61 models.

Metalworking Pulse

The Business Trend: Reflecting the beginning of the Memorial Day weekend, STEEL's industrial production index dropped 7 points to 156 (1947-49 = 100) during the week ended May 28. **Autos:** Schedules for June have been boosted slightly despite the moderate softening in new car sales which showed up in May. **Steel:** Production of 1,765,000 net tons during the holiday week ended June 5 is a new low since the strike.

- **INDUSTRIAL PRODUCTION**
  - Week ended May 28 . . . 156†
  - Year ago 169
  - Details on Page 73
- **PASSENGER CAR PRODUCTION**
  - Week ended June 4 . . 120,000*
  - Year ago 125,186
  - Details on Page 69
- **INGOT PRODUCTION RATE**
  - Week ended June 5 . . 61.9%†
  - Week ago 65.6%
  - Details on Page 133

†Preliminary. *Estimated.

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"Very pleased with all the advantages offered by Tri-Lok. Always prefer shipments to be made in this form due to handling ease, safety and convenience."
NEW YORK SMELTER

"ALCAN TRI-LOK ingots arrive compact and stay compact until we use them. They stack safely, stably—even three or four bundles high. And when straps are cut, they stay in place until fork-lift pickup."
CALIFORNIA EXTRUDER

"We're very enthusiastic about new ALCAN TRI-LOK ingots. Always liked Alcan ingot anyway . . . even more so with Tri-Lok. Mainly from point of view of stacking and handling."
EASTERN EXTRUDER

"TRI-LOK ingots cut our unloading time quite a bit. They don't shift in bundles . . . but stay in place for easy storing and fork-lift handling."
MIDWEST ALUMINUM PRODUCTS MANUFACTURER

Despite the stability of TRI-LOK bundles, there's never a separation problem—*just lift to separate!*

Here are some typical examples of what users are saying about Aluminium's newest ingot development—ALCAN TRI-LOK ingot.

Designed for more efficient handling, the new ingots lock one to another, not in just one, but in three different ways. The resultant stability means greater speed, simplicity and safety wherever ingots are handled.

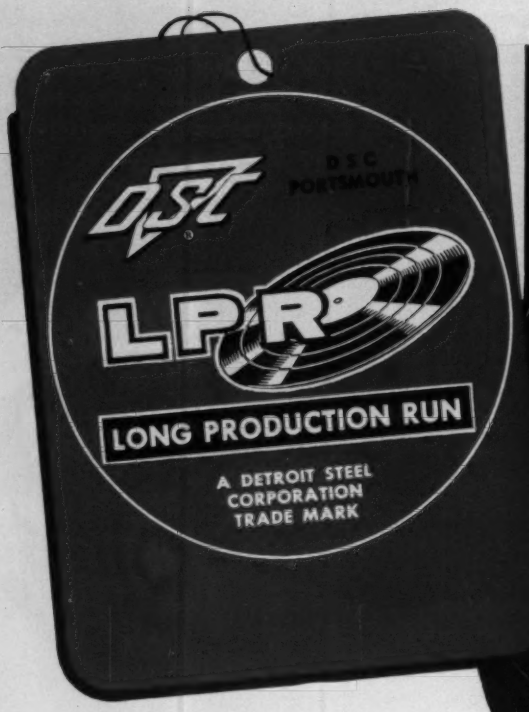
In car unloading, you find bundles arrive in excellent condition ready for quick pickup by fork lift truck. In-plant moves, too, are greatly simplified because no pallets or special slings are needed. Even after strap removal, TRI-LOK bundles remain securely intact on trucks, floors or inclined ramps.

See for yourself how TRI-LOK ingots improve worker safety . . . save time in carrying, storing and remelt charging. Just telephone or write us today.

Aluminium Limited

ALCAN

Ingot Specialist...serving American Aluminum Fabricators—
In the U.S.—Aluminium Limited Sales, Inc., 630 Fifth Avenue, New York 20, N.Y.
CLEVELAND • CHICAGO • LOS ANGELES • DETROIT • ATLANTA • ST. LOUIS



LPR's can give you as much as 40 miles of non-stop fabricating, depending on wire size

Still using brite wire in traditional mill-weight bundles?

Look at these *LPR benefits as reported by users who broke the small coil habit

● Work stoppages for coil changes and set-up adjustments cut as much as 95% ● Cumulative coil-remnant scrap trimmed to the bone. ● Manhour costs dropped 20% and more. ● Unloading time, in one case, reduced 75%; other material handling savings from 16 to 50%. ● Coil storage space reduced 15 to 20%, inventory management improved. ● Productivity boosted, in one case, 33⅓%: One man now runs four cut-off machines against 3, previously. ● "Returnable-carrier" annoyances and small storage racks eliminated.

Customer Satisfaction—Our No. 1 Job

Customer "REP" Offices in Principal Cities

COPYRIGHT DETROIT STEEL CORPORATION 1960

How one user feels about LPR's—

"Using 150 to 400 pound bundles was like busy city driving—stopping, block after block, for stop signs and light changes . . . LPR fabricating is more like turnpike traveling. We just keep going for miles at a stretch—saving time, temper and, above all, costs."

For full information about best-in-the-long-run LPR's or other DSC products, please call your nearest DSC Customer "Rep" or write Detroit Steel Corporation, Box 7508, Detroit 9, Michigan.

Performance Proved DSC®

DETROIT STEEL

Flat Rolled and Wire Products

What Price Prosperity?

The economic forecasters tell us that the gross national product will reach above $500 billion this year—maybe $510 billion. That would be a record.

Yet in the midst of this prosperity we find these paradoxes:

- Some basic metal producers are engaged in price cutting.
- Many component makers, especially foundries, are price fighting.
- Equipment builders have been doing it.
- So have steel fabricators.
- And appliance retailers.

Across the face of metalworking spreads this shadow. Why?

"Foreign competition," answer many.

"Just plain competition," say others.

"Somebody starts it, and we have to go along or go out of business," explain some.

Does price fighting help?

Capital equipment makers had net earnings on sales of less than 2 per cent in 1959. This year profits are up a little, but not much.

Some steel fabricators admit to booking business they know will be at a loss.

We sympathize with those forced into price cutting. We question the economic intelligence of those who start it. We are puzzled at those who won't admit to doing it or won't discuss it, wanting to push it under the rug like dirt.

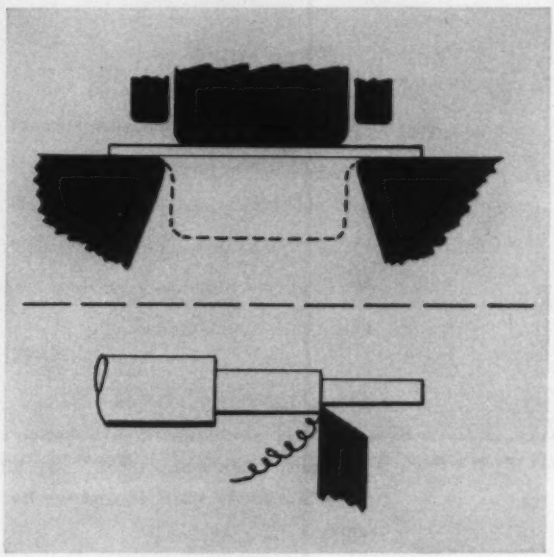
The answer to price fighting will come only when the problem is examined openly.

Good business without profits is meaningless!

Irwin H. Such
EDITOR-IN-CHIEF

WHY ARMCO STAINLESS MEET DESIGN NEEDS AT

Armco Stainless Steels enable you to design to your specific needs at least cost because they are available not only in all the standard types but in many special grades as well. You can select an Armco Stainless Steel with the most economical durability; with fabricating properties suited to your design and shop equipment; with special mill finishes, machinability, and heat treatment that cut production costs.



Maximum Economy

Where corrosion problems are not severe, Armco Stainless such as Types 405, 410, 420 and 430 provide necessary durability at minimum cost. Special Armco surface finishes on sheet and strip can eliminate some finishing operations. A wide range of standard and special bar and wire shapes also makes it possible to cut costs by reducing machining operations.

Fabrication Simplified

Armco produces many variations of the standard stainless types to facilitate fabrication and cut production costs. They include 11 free-machining grades, at least one for each basic type of stainless. In addition, Armco Type 304, 304 ELC and 316 ELC simplify production of welded stainless equipment. Grades such as Armco Type 305 plus special Armco processing facilitate drawing and forming.

In designing and manufacturing parts of your products that must be durable, beautiful or strong, you can profit with the specific advantages of Armco Stainless Steels. Write us, describing your requirements, or fill out and mail the coupon. Armco Steel Corporation, 1740 Curtis Street, Middletown, Ohio.

ARMCO STEEL CORPORATION
1740 Curtis Street, Middletown, Ohio

Send me information on Armco Stainless Steels recommended for the following service:_____

NAME_____

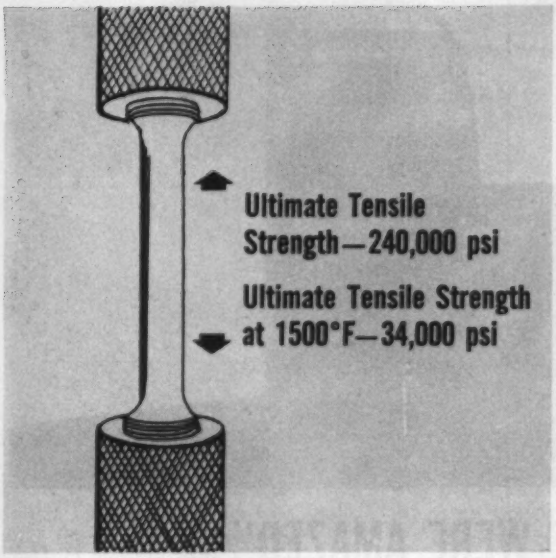
COMPANY_____

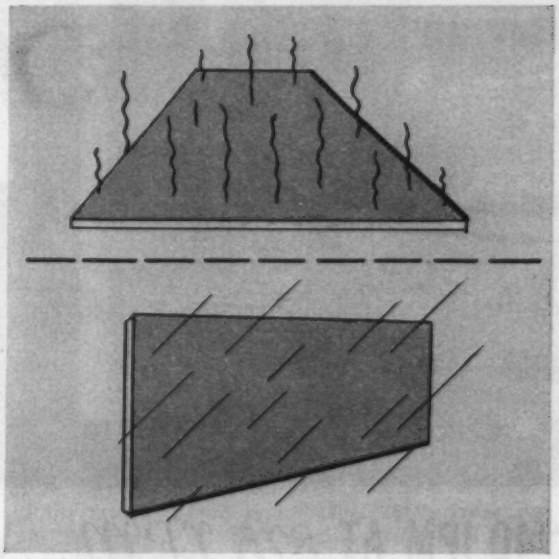
STREET_____

CITY_____ ZONE____ STATE_____

STEELS CAN HELP YOU LEAST COST

New steels are born at Armco





Unique Properties

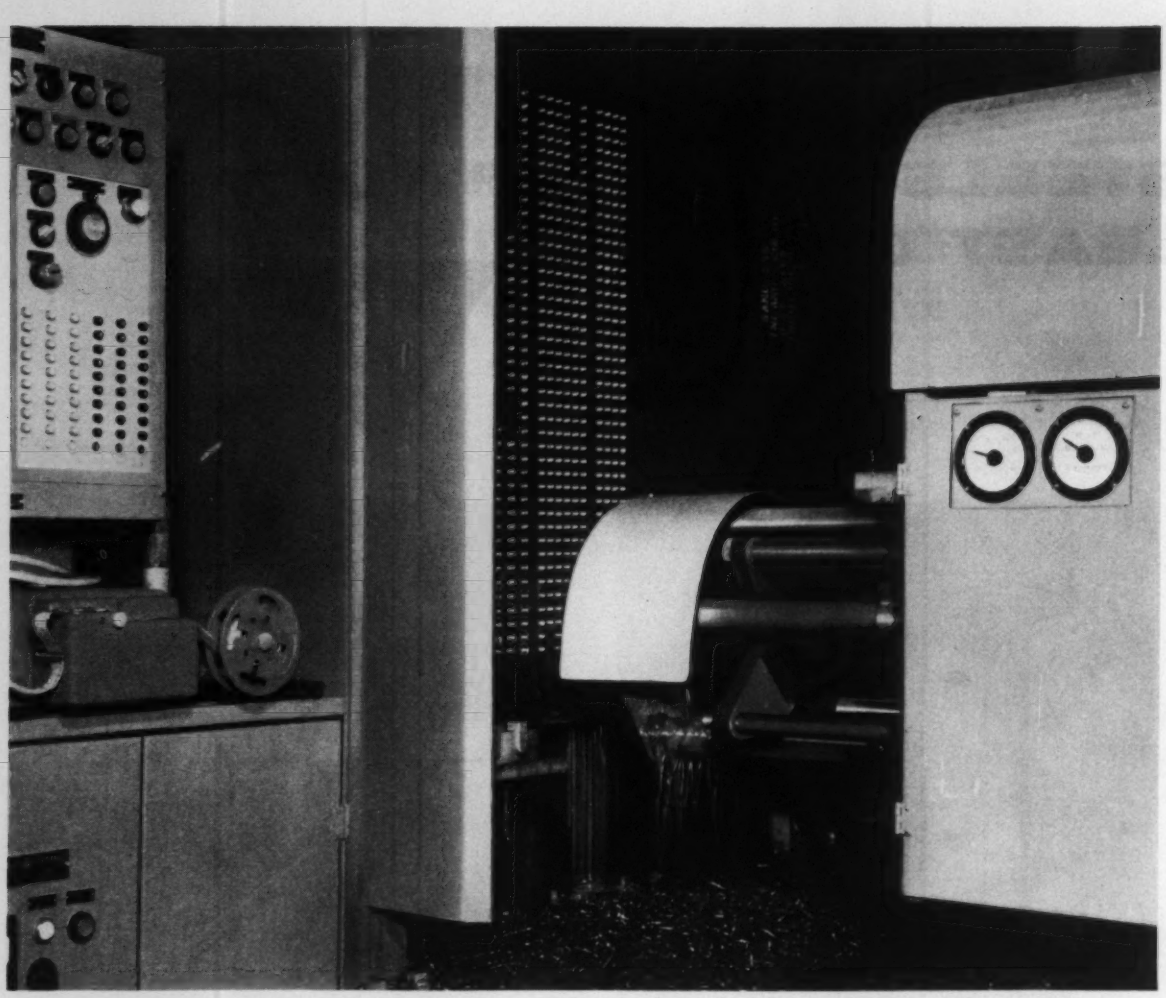
Armco has developed many special stainless steels with unusual combinations of properties to meet specific demands for better materials. Typical examples are Armco 17-14 Cu Mo with high temperature strength and oxidation resistance; Armco 17-4 PH, 17-7 PH and PH 15-7 Mo with ultra-high strength and hardness plus good corrosion resistance and excellent fabricating properties; and Armco 17-10 P, a high strength grade that is non-magnetic.

Maximum Durability

Where service conditions are severe, Armco's standard or special stainless steels offer the possibility of maximum durability at lowest over-all cost. About 25 different grades of Armco Stainless Steels are available for applications that require superior resistance to oxidation or severely corrosive media in combination with high strength at room and elevated temperatures.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation



"40 IPM AT *875 rpm*... WE WERE AMAZED"/ *says Walter P. Hill*

DATA:	1020 LEDLOY LEADED PLATE 1½" THICK	1020 NON-LEADED PLATE 1½" THICK
PENETRATION RATE Production Run	40 IPM	20 IPM
DRILL SPEED Production Run	875 RPM	750 RPM
MAXIMUM IPM Test Run	up to 47	up to 28
CHIP CHARACTERISTICS Thickness Temperature Type	.060—.080 cool broken	.040—.060 cool curled

"Ours is a specially designed numerically controlled jig drilling machine with which we obtained penetration rates of 20 Inches Per Minute at 750 RPM in standard half-inch thick 1020 steel plate. However, with the same set-up, we easily obtained 40 IPM at 875 RPM in INLAND LEDLOY leaded steel plate three times as thick and with far better tool life.

■ "Actually, in LEDLOY, we reached penetration rates of 46 and 47 IPM but consider the 40 IPM more practical for production runs. Our programmed test run was made on steady plates for large condensors in which 1½" LEDLOY steel plates were used. As a control, equivalent drillings were made in non-leaded plates of the same chemistry and the same thickness. Our load meter showed the same pulled load on LEDLOY at 40 IPM as we pulled on the non-leaded plate at 20 IPM. Tool life using LEDLOY plates at 40 IPM was equal to tool life using non-leaded plates at only 20 IPM.

■ "We conclude, and without hesitation state, that LEDLOY displayed a marked improvement."

Walter P. Hill, President
WALTER P. HILL, INC.
DESIGNERS AND BUILDERS
SPECIAL AUTOMATED MACHINES
DETROIT, MICHIGAN

LEDLOY®
the world's most machinable steels

INLAND STEEL COMPANY INLAND
30 West Monroe Street, Chicago 3, Illinois

1960 Bargaining: Metalworking Gains on Management Rights Issues

Headway is unspectacular but discernible. It's coming primarily in these areas:

1. Work standards.
2. Contracting work out.
3. Plant closings and relocations.
4. Resistance to pattern settlements.

ONE OF metalworking's most persistent champions of management's rights, General Electric Co., will make the labor headlines June 13.

That's the date for a session in New York when James Carey, president of the International Union of Electrical Workers, will present his union's demands to the company. Many are expected to be in the area of job security and other matters of management rights.

• **Just Listening** — Next week's performance by Mr. Carey, presaging bargaining later this summer between GE and the IUE, will focus attention on the problem, one of the key industrial relations issues in 1960. GE officials will be just listening June 13 because the contract stipulates bargaining starts about mid-August at the earliest.

Formerly, the IUE president has presented demands by letter in advance of formal bargaining. This year he wants to do it orally. GE's five-year contract with the IUE expires Oct. 1.

• **Employment Security**—Mr. Carey will name employment security as the issue uppermost in the minds of his members. He includes better work scheduling in the demand. The scheduling problem has been a thorny one for years. Look for GE management to insist on their rights to handle it.

Metalworking management is generally tenacious this year in hanging on to its prerogatives. "It has to be because we have reached the saturation point on union demands and gains," points out Kenneth Porter, research director of the Employers Association of Detroit. He and other labor observers believe we're making some progress in work standards, contracting out, plant closings and relocations, and resistance to pattern settlements.

• **Work Standards**—At least four major suppliers of auto parts have recently achieved substantial cost reductions through negotiation of tighter work standards. The unions went along when cost and other competitive facts were laid on the line. Associated Industries of Cleveland reports that other industries in the northeastern Ohio area which it serves have been able to travel a similar route.

• **Contracting Out** — Management attitudes are hardening here too. "The union protested when I bought screw machine parts outside," reports an Illinois manufacturer who has a screw machine department. "It didn't understand the economics of the situation—that on some specials I can get a better price from job shops than from my own machines. I gave the union the facts. I can't say it's happy, but it didn't strike."

• **Plant Closing**—Management has made progress in this one but at a price. Severence pay plans, sometimes tied in with Supplemental Unemployment Benefits, are being granted increasingly this year.

• **Resistance to Patterns** — Settle-

ments are still influenced by the bigger pacts, such as in steel, but bargaining is more individualistic in 1960 than usual, the AIC believes. For example: The average direct wage increase thus far this year is about 7 cents. Steel gave 8.4 cents. Steel companies now pay full insurance costs. Other companies try not to go that far, although many contracts have been signed this year where employers pay 60 to 80 per cent of total costs, in contrast to the former 50 per cent.

• **Why Gains on Rights?** — This year, metalworkers are making progress with management rights for several reasons. Three stand out:

1. The most important is that management is realizing it must hold on to its diminishing prerogatives or perish. The specter of foreign competition has helped stiffen backbones.

2. Labor is leery of strikes this year and reluctant to challenge management on this matter with a walkout. The example in steel is still fresh in everyone's mind.

3. Union locals are showing a little more independence and disposition to listen to and take into account local problems. That makes it easier, particularly on work standards. The independence movement probably stems from the Landrum-Griffin Labor Act which allows more voice to members and hence more voice and power for locals. It's still too early to know if the trend will last, but at least it has helped in 1960.

• **Central Issue** — Management rights—local work rules—were one of the controversies at the bottom of the steel strike. Steel industry management lost that fight. Other metalworking managements have noted that loss and the reasons for it. One of the chief causes of the failure was that work rules and other management rights are difficult to negotiate on a national scale. The issue varies from company to company and even from plant to plant within one firm.

So, it must be negotiated locally, which is what's being done now. GE has long been a proponent of local bargaining on this matter. That's why its coming strategy on management rights bears watching.

Coal Mining Firm Gets Set To Produce Aluminum

Cleveland company develops process to extract aluminum oxide from coal mine waste, will build facility on Ohio River to market aluminum sulfate and alumina

THE BLUE-GRAY mountains of mine wastes that line the Ohio River near Wheeling, W. Va., may some day be turned into shiny aluminum. North American Coal Corp., Cleveland, is developing a process to retrieve aluminum oxide from the coal mine waste. While the firm's plans only go as far as the marketing of aluminum sulfate and aluminum oxide, the company could become a primary aluminum producer.

Completely integrated aluminum production is a good possibility: Large coal reserves remain in the company's nearby mines; electricity is available from an Ohio Power Co. facility; major markets for aluminum surround the site—and many of the markets could be reached cheaply by barge.

• **Raw Material Plentiful** — North American's beneficiation process will extract 100,000 tons of alumina from 500,000 tons of mine waste—the amount now generated annually by two local mines. Projected mining operations would double that amount. The industry generally figures you can get 50,000 tons of aluminum from 100,000 tons of alumina.

But North American has reserves that make even that big figure seem trifling. Dr. Robert L. Savage, the firm's vice president-research, told STEEL that the coal company has 10 million tons of mine waste stockpiled above the ground. And he says around 200 million tons are underground. The huge reserves could be brought to the surface fairly economically—the only cost would be the transportation; no real mining operations would be needed, since most of the material is shale "roof fall."

The 10 million tons of waste now on the surface is gob and red dog—with lower sulfur content and higher alumina content (22 to 25 per cent).

• **Byproduct of a Byproduct**—The coal mine waste also contains a heavy concentration of silica which might be reclaimed in the beneficiation process and sold for use as glass sand or to manufacture silicon carbide.

• **Present Plans**—The company will build a $1 million plant at Powhatan, Ohio, to initially produce aluminum sulfate. About 60 per cent of the output will go to the pulp and paper industry (where it's used as a whitening agent) and 30 per cent will go to municipal water treatment plants (where it is used to bring fine particles together so that they can be filtered out of the water).

That brings the company to the half-way mark in its potential of being a fully integrated aluminum producer. Its ability to go the rest of the way hinges largely on the development of the second half of the beneficiation process—which has already been proved technically feasible in pilot plant operation.

The process, a joint development of North American and Strategic Materials Corp., works this way: The mine waste is leeched with concentrated sulfuric acid; the silica and other residue are filtered off; and a high purity aluminum sulfate remains. Then the aluminum sulfate can be thermally decomposed to produce aluminum oxide with the acid values being recycled in the process.

The company now plans to market the aluminum oxide to aluminum producers (several are within barge distance) and to manufacturers of abrasives, ceramics, and other products, says Henry G. Schmidt, the firm's president.

At American Bosch, material and part needs are determined as . . .

IBM's New System Controls Complete Production Cycle

CONTROL of manufacturing cycle functions, from raw material to finished product, can be combined into a single operating system through data processing, declares Gilbert E. Jones, president of IBM's Data Processing Div., New York.

IBM has introduced a new total systems approach known as the Management Operating System (MOS). Requiring only present data processing equipment, the system can be fully activated by a customer order in punched card form. It will carry out six interrelated functions in manufacturing —sales forecasting, material planning, inventory management, plant scheduling, work dispatching, and operation evaluation.

• The concept is said to be applicable to thousands of manufacturing companies regardless of size.

It represents advanced exploitation of present machine capabilities. Equipment used can range in size from punched card units to the largest commercial computers. The only ultimate machine requirement is fast random access capability, with access time to information stored in the system not exceeding one-half second, IBM officials explain.

The basis of the system is the interaction of manufacturing control functions which generate plant activity. Example: Sales forecasting produces a finished product plan as machine output which, in turn, is entered as input for material planning. The finished product plan, when passed against the bills of material stored within the system, produces total material requirements. Those requirements are checked against inventory, also stored within the system, to initiate purchases and manufacturing orders.

The chain of events, which is set in motion each time customer orders are entered into the system, continues through scheduling, dispatching, and operation evaluation.

The evaluation function monitors the preceding five functions and automatically creates exception reports for management. The reports bring to management's attention any significant variations from operational standards.

• The techniques are saving $120,000 a year in production costs at one firm.

American Bosch, a division of American Bosch Arma Corp., Springfield, Mass., developed its program to automate planning and scheduling of workpiece material control. The company uses an IBM Ramac 305 electronic data processing system.

American Bosch regularly activates the complete processing of a production schedule order with a single punched card. Within 3 minutes, the computer can determine the effect of the order on all 15,000 parts which go into 1000 American Bosch end products. Components are allocated from stock or scheduled for production in economical quantities by the computer.

• Here's how the data processing system is saving money, explains S. E. Miller, vice president and division manager:

With automatic control of economic order quantity procedures, the number of shop orders processed each year already has been cut by 4000. It costs the division $30 to prepare an order.

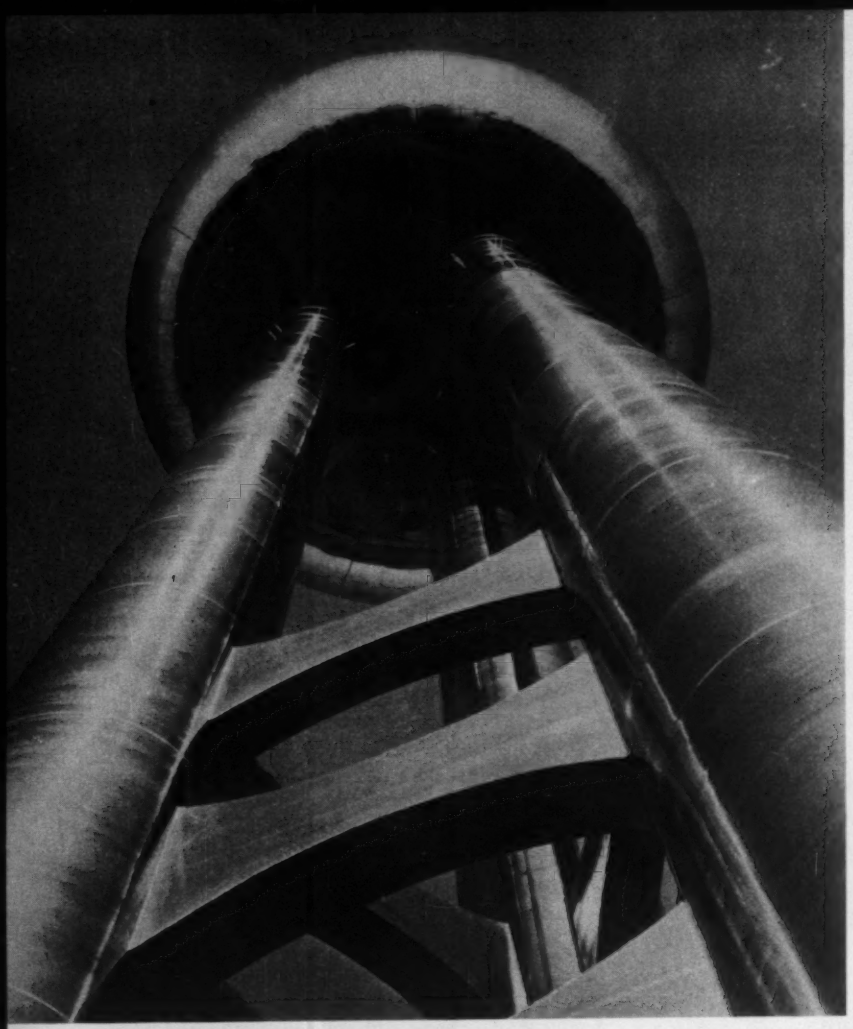
As a byproduct of that reduction, machine setup costs—$20 to $100 each—are also being reduced sharply.

Production schedule changes can be entered into the system immediately.

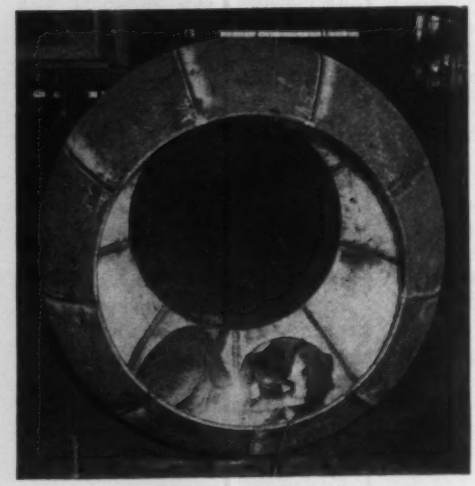
Annually, the system will automate the standard cost revisions and reduce the cost of the operation by 70 per cent.

Clad Metals

Despite beauty that's only skin deep, today's combinations are drawing more admiring glances in new esthetic and structural applications. They've been limited largely to the innards of corrosion resistant tubes and containers



Gleaming stainless clad steel, produced by Lukens Steel Co., forms this 138 ft water tower at General Motors Corp.'s Technical Center near Detroit. The tower was designed, fabricated, and erected by Chicago Bridge & Iron Co.



Workmen weld seams in nickel-clad surface of Horton-clad spheres fabricated by Chicago Bridge & Iron Co.

Stainless clad steel, which accounts for most of the tonnage in clad metals, is gaining more attention in critical structural applications as well as in some tonnage markets where eye appeal counts.

Currently, its major uses include process vessels for the food, oil, chemical, and paper industries; tank cars and hold tanks for transporting chemicals; food service equipment and counter tops; dam construction and structural expansion joints. Producers are shooting for these new markets: Curtain wall building panels, truck and railroad car bodies, guard rails and bridge railings, cookware, and automobile bumpers.

● **Demand is growing for: Heavier plate gages, new cladding materials, and closely engineered properties, say clad metal makers.**

Lukens Steel Co., Coatesville, Pa., a major producer of stainless clad plates, estimates that production has doubled since 1950 and will redouble in the next decade. "The bulk of our business," says Joseph H. Proctor, manager of application engineering, "is in 300 and 400 series stainless clads and in nickel, Monel, and Inconel. We have recently developed clad steels with a yield strength of 50,000 psi in both cladding and backing steel—a typical example of the engineered properties which are sometimes required."

Demand for heavier gage plates, 2 to 4 in. thick, is picking up, says James F. Neil Jr., assistant plate manager of the Claymont Products Dept., Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., Wilmington, Del. He notes the heavy

Move into New Markets

gage plates are going into refinery pressure vessels and dam construction.

David T. Smith, manager of clad plate sales, Jessop Steel Co., Washington, Pa., points out: "Tool steel clad plate, now developing into an accepted material of construction, shows promise in combating extremely severe abrasion problems. It offers the advantages of solid tool steel in wear resistance, with the advantages of forming and welding in fabrication and installation, plus higher shock resistance because of the soft backing steel." These producers also offer a wide range of carbon and alloy backing steels.

• New combinations and bonding techniques are widening the potential for composite metals.

Developed in the 1930s, clad combinations at first suffered because of suspicions about strength and analysis of the clad layer. Today, producers have developed a number of techniques which assure high standards of strength and purity in the cladding material. Recent clad metal developments include:

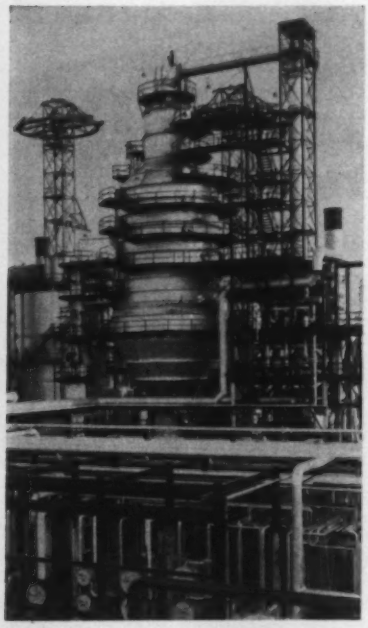
• Wedding of titanium to both stainless and mild steel with Chicago Bridge & Iron Co.'s vacuum bonding Hortonclad process. CB&I has developed a welding technique to close titanium clad plate seams without welding the titanium directly to steel. Other combinations being researched by CB&I include stainless steel to copper, Inconel to copper, Monel to stainless, and Inconel to stainless and carbon steel.

• Production of stainless clad steel for commercial bus bumpers by Allegheny Ludlum Steel Corp. and Ingersoll Steel Div., Borg-Warner Corp. One U. S. maker of compact cars is considering stainless clad bumpers. Reason: They'll still be shiny when they reach the used car market. "The market for clad stainless will be several times its present size if bumpers like these are adopted by only one important car," predicts William B. Pierce, Allegheny Ludlum's vice president-sales.

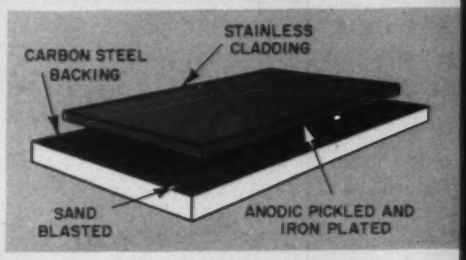
• Automatic joining of complex assemblies, with brazing alloy clad strip metals. Alloy clad base metal can be stamped into discs, cylinders, or special shapes, fitted into blind or multiple joints, and treated in conventional heating facilities. The resulting braze covers the entire joint area uniformly with no need for control of metal flow.

• Introduction of some 100 clad metal combinations last year in the manufacture of semiconductors by the Metals & Controls Div., Texas Instruments Inc. New clad metal composites are going into silicon base tabs, germanium base tabs, bases, lead wires, and enclosures. A growing demand is foreseen for double-clad base materials and striped clad metals, says the division.

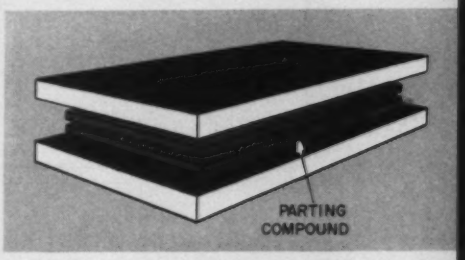
Nuclear and space age applications are broadening the range of clad metals even more. Nickel and stainless clad steels form the hides of military and civilian atomic power reactors and storage tanks for jet and missile fuels.



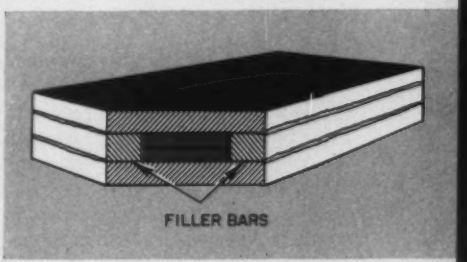
This refinery vacuum column meant a tall order for Chicago Bridge & Iron Co.'s Monel and stainless Hortonclad steel



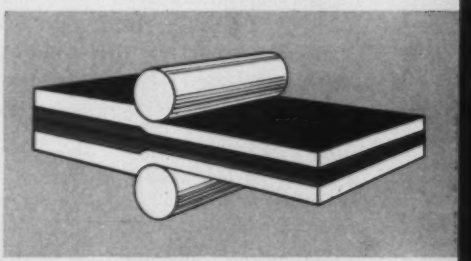
In Jessop roll cladding process, backing and cladding surfaces are cleaned



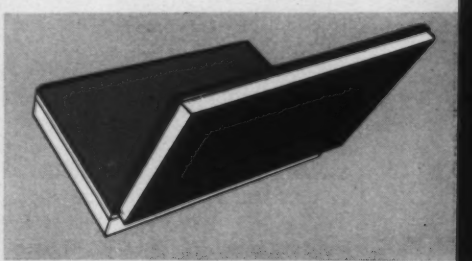
Then assembled in sandwich, with refractory material between clad inserts



Overlapping carbon edges are welded to hold assembly intact during rolling



Heated plates are fused in conventional plate rolling mill



Composite slab produces two clad plates to be annealed and cut to size

Air Conditioning Sales

(In thousands of units)

	Room units	Central systems
1959	1800	200
1958	1673	120
1957	1586	145
1956	1828	125
1955	1283	90

Estimated STEEL.

Tax Spurs Conditioner Sales

AIR CONDITIONING equipment makers are waiting out the hot spells that can start sales temperatures climbing.

"As usual in this business," says one, "an early heat wave can make all the difference between an outstanding year and a mediocre one." Few manufacturers look for 1960 business to match the sweltering pace they enjoyed last year. Some producers sold up to 121 per cent more room cooling units in 1959 than they did in disappointing 1958. This year, they're expecting volume to climb 10 to 20 per cent, assuming the weatherman co-operates.

Some of last year's volume represented a mixed blessing. A sizable percentage of sales to distributors was hedged against a 10 per cent federal excise tax on room air conditioners produced after Dec. 1. "Normal seasonal patterns in the room air conditioner business have been badly distorted by the tax," says R. L. Old, market research manager, Emerson Electric Mfg. Co., St. Louis. "As a result, we are not sure whether early seasonal strength has been due to the tax or to substantial reductions in inventories on the part of distributors. We feel it's probably a good bit of both."

Most manufacturers say distributors' stocks are higher than normal, but they will not be excessive if a warm selling season develops.

• **Prices**—They'll be up moderately throughout the line of residential equipment.

• **Market Trends**—Air conditioning applications are broadening.

• Central systems are growing in popularity. York Div., Borg-Warner Corp., has a 60 per cent room and 40 per cent central residential product mix. It finds that central equipment has been increasing in percentage over the past few years. Mueller Climatrol Div., Worthington Corp., Milwaukee, estimates industry sales gains this year will match last year's increase of 49 per cent.

• New designs are on the market. Units are offered with aluminum, baked enamel, plastic and plastic-coated steel finishes. General Electric Co.'s new, through-wall room unit has a decorator's baffle which can be painted, papered, or finished to match the buyer's furnishings.

• Manufacturers say gas-fired central cooling systems and electric heat pumps are on the upswing. Westinghouse Electric Corp. says sales of self-contained heat pumps and cooling units are running well ahead of the industry's market trend, with sales evenly split between residential and commercial installations.

How Huck

DIVERSIFICATION has prompted Huck Mfg. Co. to reorganize its sales setup from territories to industry markets. Objective: The Detroit fastenermaker wants deeper market penetration, better customer relations, and improved sales training methods.

Discussing the change, George Q. Mathews, sales vice president, asserts: "We have seen the need for more specialized sales engineering knowhow along specific industry lines expand greatly as our markets have broadened and we've developed new products in recent years. Our sales realignment will enable us to keep pace with this trend."

• **History**—Huck is a 20-year-old company specializing in Huckbolt (pin and stump) fasteners, blind rivets, and engineered fasteners. Until the end of the Korean War, its primary markets were the aircraft industry and military services. But in 1953, military restrictions on Huck's defense production were lifted and the firm began to expand into other markets. It found ready buyers in railroad, marine, bus, trailer, and construction industries. Today, only 50 per cent of its dollar sales volume comes from aircraft and military sales. Annual sales income has risen from $500,000 to more than $12 million.

• **Old Way**—Even though Huck was increasing product lines and investigating new markets, it still depended on the same basic sales organization which was set up to handle defense business. Four sales divisions reported to Mr. Mathews. A zone manager was in charge of each division, covering a section of the country. Each division was responsible for all markets and all products in its area.

That method made for problems. It was difficult for each division to develop the specialized technical knowledge it needed to engineer Huck products. Customers who had special problems in one industry sometimes needed the services of specialists working halfway across the country. It was difficult to co-

Changed Its Marketing to Keep Pace

ordinate the chain of command. Communications left much to be desired. Sales trainees were subjected to a month long formal training program covering all products and territories, but Mr. Mathews found it took at least 18 more months for the man to become proficient in his territory.

• **New Way**—Last year, Huck began the switch from territories to markets. It now has seven sales divisions. Each division manager reports directly to Mr. Mathews. Each division manager has a group of engineering specialists assigned to him to help cover the industry he's responsible for. Divisional headquarters are in areas of prime business.

The aircraft division is headquartered in Atlanta, with an assistant sales manager in Los Angeles. The setup improves service to prime and subcontractors. Government sales are headquartered in Washington, construction in St. Louis, railroads in Philadelphia, and marine sales in New York. A special product sales division with headquarters in Detroit is responsible for developing new markets for headed and rolled products.

There's one exception: The commercial division, in Los Angeles, handles sales of all Huck products for the West Coast area, with the exception of aircraft and government.

• **Advantages**—Huck's biggest gain already has shown up in improved customer relations. "Our customers like the idea of a sales organization tailored for their industries and staffed by men who are completely familiar with their problems," explains Mr. Mathews. Liaison and service also are improved.

Sales training still takes as much time as it did before, but each trainee can concentrate on the market which he'll be selling rather than trying to learn all the ins and outs of seven different markets. Mr. Mathews figures the approach will cut in half the time it will take for each salesman to become fully operative.

Says George Q. Mathews, sales vice president: "Change is natural if you are to keep pace with new and growing markets"

"There's a greater need for more specialized engineering knowhow along specific industry lines"

"Our customers like the idea of a sales organization tailored to help them solve their problems"

You Have Stake in Tariff Bargaining

UNCLE SAM has made his ante into the world's biggest foreign trade poker game. By offering concessions on certain imports, he hopes to gain concessions from foreign countries for our exports. The poker game is officially called the General Agreement on Tariffs & Trade (GATT). Negotiations among 28 countries begin in Geneva, Switzerland, in September.

Examples of products the U. S. is willing to negotiate are shown below. All told, U. S. tariffs could be lowered on 2200 items—if Uncle Sam gains concessions on exports. See sample list below.

● **Hearings Set**—Both lists are subject to comment by American businessmen. The Committee for Reciprocity Information and the Tariff Commission will hold public hearings on July 11. State and Commerce Department officials emphasize that the two lists are by no means final. They expect plenty of criticism.

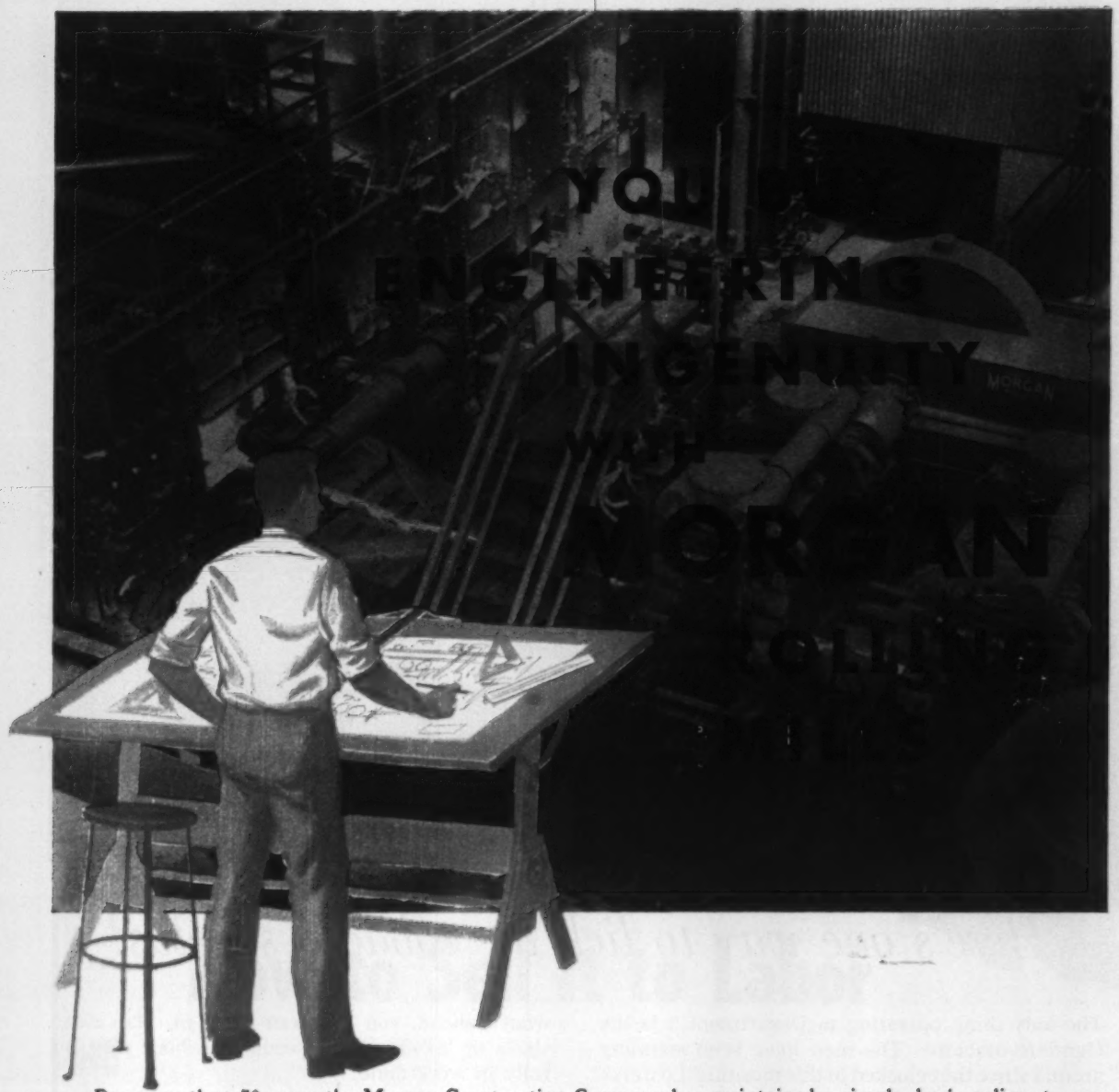
The first phase of the GATT conference will cover negotiations with members of the European Economic Community; the second phase will cover other countries. Besides the community nations, the U. S. will negotiate with Australia, Austria, Canada, Chile, Denmark, Dominican Republic, Finland, Haiti, India, Japan, New Zealand, Nicaragua, Norway, Peru, Sweden, United Kingdom, and Uruguay.

Under the Trade Agreements Act, U. S. negotiators can agree to cut our import duties as of July 1, 1958, by 20 per cent. Businessmen wishing to comment must contact the Committee for Reciprocity Information by June 27.

● **INCREASED EXPORTS TO THE SOVIETS**—Export licenses for shipment of U. S. goods to Eastern Europe hit $35.4 million the first quarter of 1960 vs. $30.5 million in the last quarter of 1959, says the Commerce Department. Included in the exports were $12 million worth of cold rolled carbon steel sheets to the USSR, East Germany, and Czechoslovakia. At least one large shipment of alloy steel is scheduled for delivery to East Europe, if Commerce approves, reports a Washington source.

Poker Game Begins

U. S. may make concessions on these imports	If . . .	Concessions by others are made on these exports
Some vanadium products		Steel ingots, blooms, billets, and slabs
Manganese ore and concentrates		Wire rods
Molybdenum ore and concentrates		Hot and cold rolled steel sheets
Many tungsten alloys		Many tin plate products
Many types of iron or steel plates		Pipe, pipe fittings
Iron or steel sheets valued at more than 3 cents per pound		Structural shapes
Many wire rod products		Iron and steel castings
Woven wire cloth		Steel forgings
Antifriction balls and rollers		Many hardware products
Many cast iron products		Aluminum foil
Many chain products		Aluminum ores, ingots, plates, sheets, shapes, castings, and forgings
Some nails		Copper ingots, scrap, tubing, sheets, wire, and cable
Grit and shot		Electrical machinery
Many metal cutting tools		Household appliances
		Construction machinery
		Metal cutting and forming tools
		Automobiles



For more than 70 years the Morgan Construction Company has maintained a simple, basic policy: to concentrate upon and maintain leadership in the rolling mill field. • To maintain this leadership Morgan uses a highly skilled, ingenious team of engineers backed by the experience of many years in the field. Productive ingenuity is an integral part of every Morgan Rolling Mill, and every unit of Morgan Rolling Mill equipment. • To prove the soundness of the Morgan design you may see Morgan Mills in operation in 17 countries over the world rolling a high percentage of the world's output of billets, rods, narrow strip, skelp and merchant shapes.

MORGAN
WORCESTER

MORGAN CONSTRUCTION COMPANY

WORCESTER, MASSACHUSETTS

ROLLING MILLS • MORGOIL BEARINGS • GAS PRODUCERS
WIRE MILLS • EJECTORS • REGENERATIVE FURNACE CONTROL

RM-93

Here's one way to lick the tobacco surplus!

The only thing operating in Department 3 is the cigarette machine. The men have been standing around since they clocked in this morning. Loafers? By no means. It's just that no work has reached their department.

Yet certain other departments have more work than they can handle. Overtime on the one hand... idle time on the other. Think what scheduling like that does to profits!

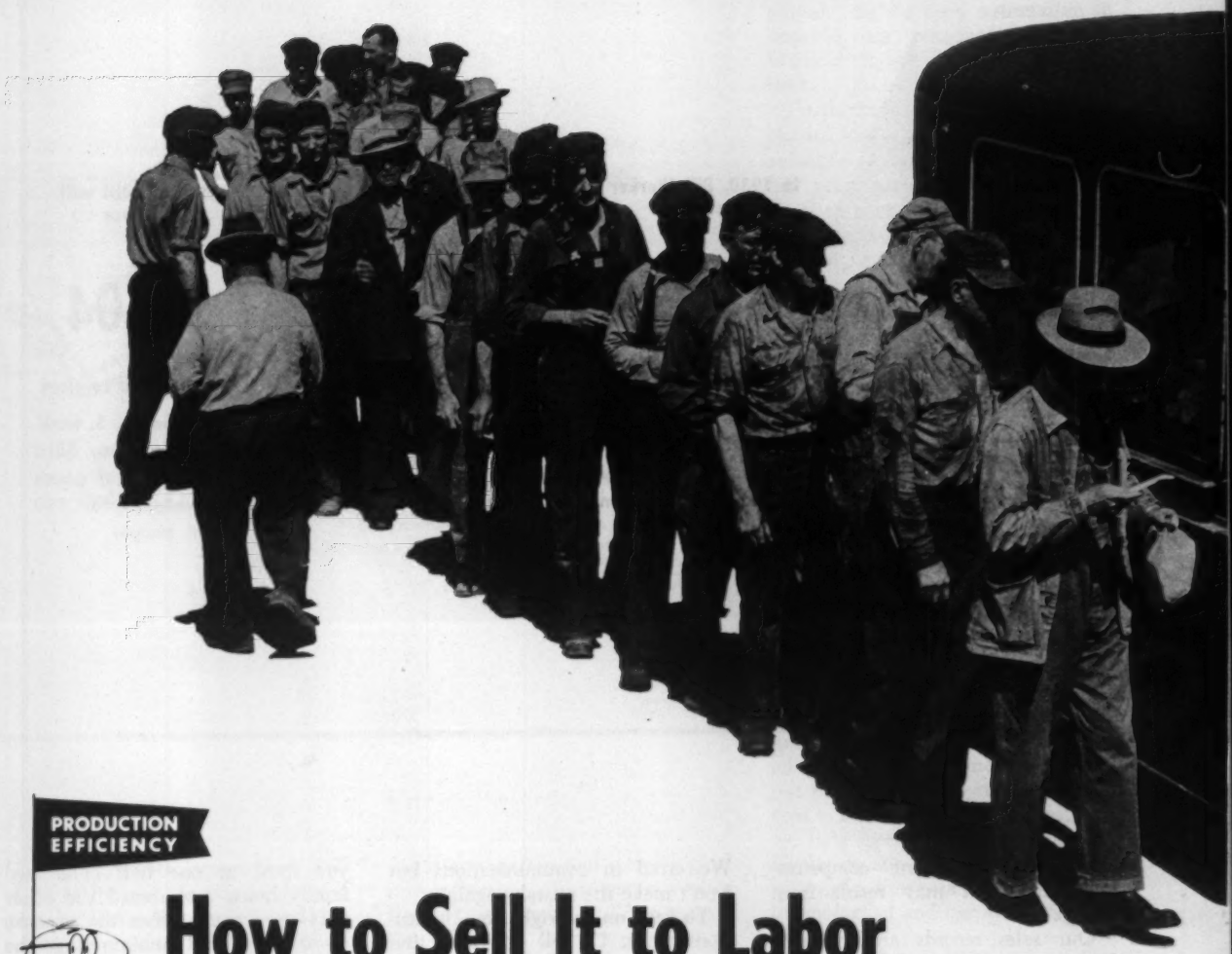
Management finds out about these things, of course—when it's too late. But with Automatic Keysort Data Processing they need not occur at all. Keysort work-load summaries enable you to schedule production jobs by department *in advance*. Knowing what's ahead, you can transfer men, plan extra shifts or layoffs so that each man-hour pays off fully in work done.

Automatic Keysort's easy-to-use machines and punched cards require no specialized personnel, no restrictive procedures. Designed to fit your business as it stands and as it grows, Keysort will give you all the fast, accurate information you need for modern management control of every operation. And at remarkably low cost.

To learn more about Automatic Keysort Data Processing, call your nearby Royal McBee Data Processing Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, N. Y. for brochure S-500.

ROYAL McBEE · *data processing division*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION



PRODUCTION EFFICIENCY

How to Sell It to Labor

Mr. William Smith
1000 Erewhon St.
Anytown

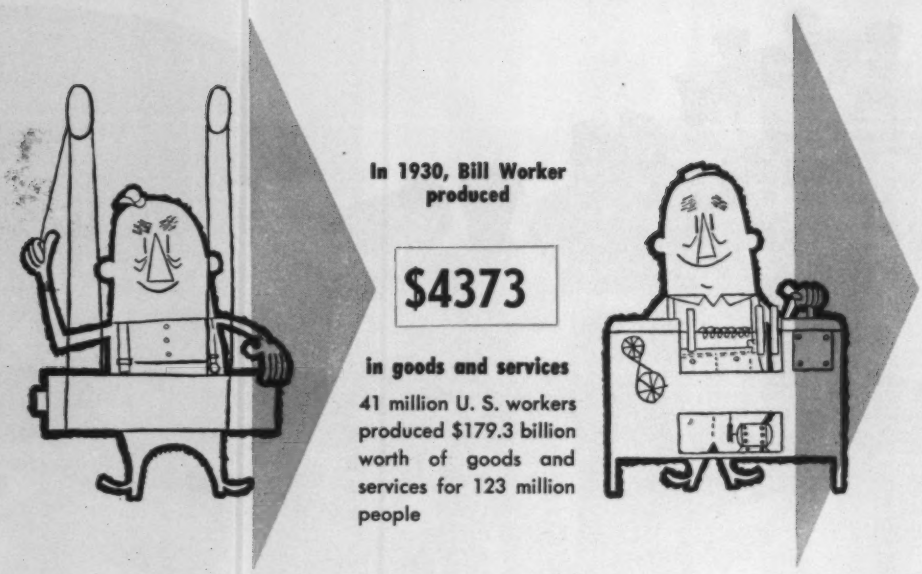
Dear Bill:

I am writing you and the seven other fellows who have been transferred from machining to other departments. This letter is about the automation question we discussed. It's a tough problem, and I want to get my thoughts organized on paper. After you have had time to study my reply, I'll be glad to talk it over with you at any time.

First, Bill, we regret we don't currently have a spot for you on our new line of automatics. I agree that the work to which you are now assigned in assembly does not make full use of your machine training. I wouldn't blame you for job hunting, but I hope you don't. The new line of products we're making on the automatics is selling well. We'll be needing new production equipment within a year. You and the seven others will get first crack at it.

We could not have produced our new line at attractive prices on the old machines. Our sales would have slipped to nothing. The crew of 20 working on the old battery would have been laid off. Instead, we bought the new units (at a cost of $360,000 and, incidentally, provided work for many men at our supplier's plant). While the new machines require only 12 operators, our revived sales provide work in assembly and other departments for the eight men who are displaced. This is no "makework" proposition as you feared—a gimmick to make you quit in disgust and thus save us from paying

The What and Why of


In 1930, Bill Worker produced
$4373
in goods and services
41 million U. S. workers produced $179.3 billion worth of goods and services for 123 million people
In 1960, Bill will produce
$7704
in goods and services
66.2 million U. S. workers will produce $510 billion worth of goods and services for 180 million people

All monetary figures in constant 1960 dollars.
Sources: Departments of Commerce and Labor, STEEL.

higher unemployment compensation rates that may result from firings.

Our sales records are available for your inspection. They show a 20 per cent gain in volume over the previous six months, necessitating more personnel for assembly and related work.

What's more, "makework" would cost us far more than the slight, if any, increase resulting in our workmen compensation rates from firing you.

The 12 who got the jobs on the new equipment were picked on the combined basis of seniority and ability. Only two of the dozen had less time with us than you. They were chosen because they both had had experience on similar types of machines in former jobs. Both, too, are several years older than you.

The point you made about our not keeping you informed of equipment buying plans is well taken. We erred in communications but won't make the mistake again.

To keep on the right communications track, I'll tell you now that we are already working on specifications for the new machines I mentioned earlier. Bid invitations should be ready in about six weeks. We should be letting contracts within three or four months, and the units should be operating on our floor within 12 months. Incidentally, if you have suggestions about features on the equipment that you think we ought to have, let me know.

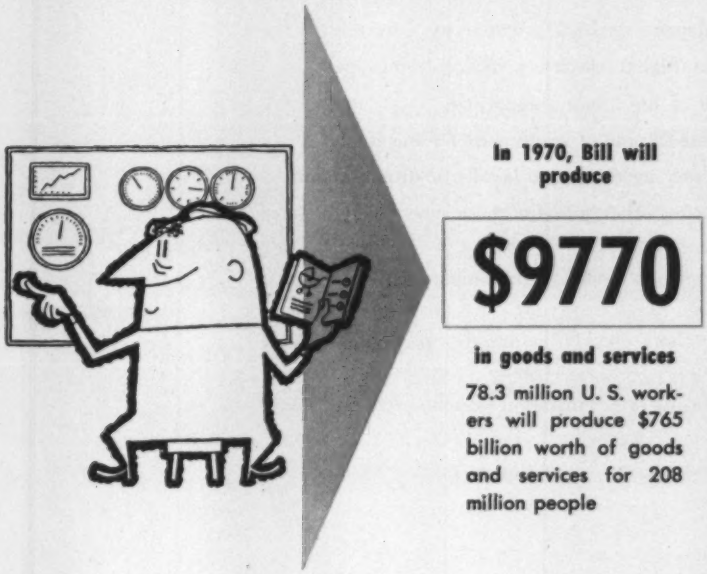
The new units will cost us about $240,000. That, plus the $360,000 for the bank of automatics, means we'll be spending about $600,000 for new equipment—a lot of money for a company our size.

We did not "get the money from the government from depreciation refunds," as you claim. Depreciation is not a refund, Bill. If you owned property for business use—if you lived in one half of a two family house and rented the other part—you could offset the expense of owning and maintaining the rented half against the rent you get for it. Similarly, we are entitled to depreciation allowances on our property used to generate income.

While the government recognizes that it costs money to make money, U. S. depreciation allowances aren't big enough to cover all the expense of equipment. We must figure allowances in terms of original cost. As you know, prices of everything have gone up. So, we have to hunt for additional money to make up the difference. The bank provides it, but charges interest for its use.

The borrowing we and many other companies do helps the economy. For every $1000 invested in capital equipment in the U. S., $350 is added to the national income. Twenty dollars of it goes for local real estate taxes, $50 goes to the

Mechanization . . .


In 1970, Bill will produce
$9770
in goods and services
78.3 million U. S. workers will produce $765 billion worth of goods and services for 208 million people

U. S. in corporate income taxes, $60 of it is interest or dividends and goes to those who saved and invested the original $1000 of capital; the remainder, $220, goes to labor as increased wages.

The $220 may seem hard for you to believe since you no longer enjoy the same incentive opportunities you had when you were on a machine. But the 12 men on the new automatics are averaging 5 cents an hour more now than formerly because of the increased productivity.

When your turn comes, you'll get equivalent earning opportunities.

You also point out that we didn't do much training or advance indoctrination for the new automatics. Guilty as charged. Our only defense is that this was the first big equipment purchase we've made. We didn't have the moxie. On the next round, we'll provide for advanced training at the builder's plant.

Finally, Bill, I come to your fears about automation and technological unemployment. You quote Walter Reuther as saying: "Automation can do untold harm to millions of innocent people."

I found that quote in one of his speeches of a few years back, but he qualifies himself this way: "While we realize the potential benefits of automation, we must not minimize the problems (it brings) for individual workers . . ."

Let's talk about the benefits first, then the problems. My accompanying drawings and statistics show some of the economics of the matter.

In 1955, the Bureau of Labor Statistics predicted that in the decade of 1955-65 this country would experience a 50 per cent increase in the demand for goods, but available manhours would go up only 15 per cent. The ratio is expected to be the same in the 1965-75 decade. Those predictions reflect a rapidly growing population and a steadily rising standard of living, plus a steady decrease in the number of hours per week devoted to productive labor and a decrease in the proportion of the population employed. So we need automation to improve our standard of living. Without it, we'd stagnate or fall back.

Furthermore, the cost-and-profit picture makes automation or mechanization a necessity. In 1950, a fair year, net manufacturing profits after taxes were 5.6 per cent of sales and 8.0 per cent of net assets. In 1959, manufacturing's best year to date, net profits were 4.6 per cent of sales and 6.3 per cent of net assets. Costs are steadily rising, profits dropping over the long pull. Automation will help reverse that trend.

Our rate of increase in productivity has been declining since 1919, according to figures developed by the Bureau of Labor Statistics. In total manufacturing, the range of average annual percentage gains is this:

1919-1929: 5.3
1929-1939: 2.2
1939-1947: 0.5
1947-1953: 3.4

Some experts believe that in the next ten years America must show an average annual increase in output per manhour of at least 3.5 per cent. The above figures reveal that we have been able to do this only in the decade following 1919. Significantly, that was a period of great technological and marketing innovations.

The worker of 1960 will produce $7704 worth of goods. In 1970, that same employee must turn out $9770 worth (at 1960 prices) to supply the greater population and the expected greater demands from the population. If he can't, heaven help us.

So, Bill, the benefits of automation might more accurately be called the necessities of automation.

What about the problems?

I've proved that mechanization is not going to cause permanent unemployment, but it does cause displacement. Joseph Harrington Jr., of the Cambridge, Mass., consulting firm, Arthur D. Little Inc., puts it this way:

"If you can justify the introduction of a new machine, you expect that the savings in labor, material, and other production costs will be

How to Sell Labor on Production Efficiency

1. Show that jobs depend on high productivity.
2. Demonstrate that higher efficiency means higher pay.
3. Present the facts of life about competition.
4. Let workers affected know of equipment buying plans.
5. Be honest about any necessary job layoffs or displacements.
6. Give help in getting other jobs for those who you will have to discharge.
7. Don't "make work" for unnecessary employees; discharge is fairer.
8. Report on your plans quickly before the grapevine spreads rumors that will take time and trouble to correct.
9. Show how increasing mechanization has boosted our living standards.
10. Show how continuing mechanization is needed to meet foreign competition.

equated to the costs of developing and building the new machine. While the expected savings come only partly from labor at the machine operator level, the development and construction of the automatic machinery is largely labor and draws upon highly skilled machinists, electronic technicians, and engineers. On a dollar-for-dollar basis over the two-to-five year payback period, we are absorbing scarce and expensive manhours of skilled labor when we displace an equivalent value of semiskilled labor."

This upgrading has been going on for years. At the turn of the century, 7 per cent of the total work force was in science, engineering, and other highly trained categories. Today, the percentage is 24.

Man will always be with us, as the design engineer was reminded when he told a test pilot: "Your days are numbered; before many months, automatic controls will be running these new planes from the ground."

Replied the pilot: "I'm not worried. You have yet to improve upon man—a control mechanism that weighs about 150 lb, has five senses, six degrees of freedom, is completely self-contained, self-powered, self-lubricated. Above all, you have yet to invent a control device so readily and easily produced by inexperienced labor."

Few operations are as mechanized today as the telephone companies. In 1935, when Ohio Bell Telephone Co. was 58.6 per cent dial operated, it employed 2575 telephone operators. It had 8158 people on its payroll. Today, it is 100 per cent dial operated but has 6062 telephone operators and 19,883 total employees on its payroll.

Bill, our company must mechanize. We'll do our best to deal with the problems it generates through increased training, better communications, and assistance in finding other jobs. Thank God, we had no trouble finding other work for the eight of you.

Yours truly,
Sam Martin
Plant Superintendent

P.S. Bill, this letter is an example of one-way communications. Let's make it two-way by hearing from you.

My door is always open, so come in at any time. Don't let those grapevine rumors go unchallenged. Check them out with me.

S.M.

Production Efficiency

How It Pays Off

On June 20, STEEL will conclude the series on how to improve the buying and use of production equipment. For a free copy of any or all articles in this Program for Management (running every other week since Jan. 11) write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. By using material like this, you may win $1000. For details, see Pages 5 and 6.

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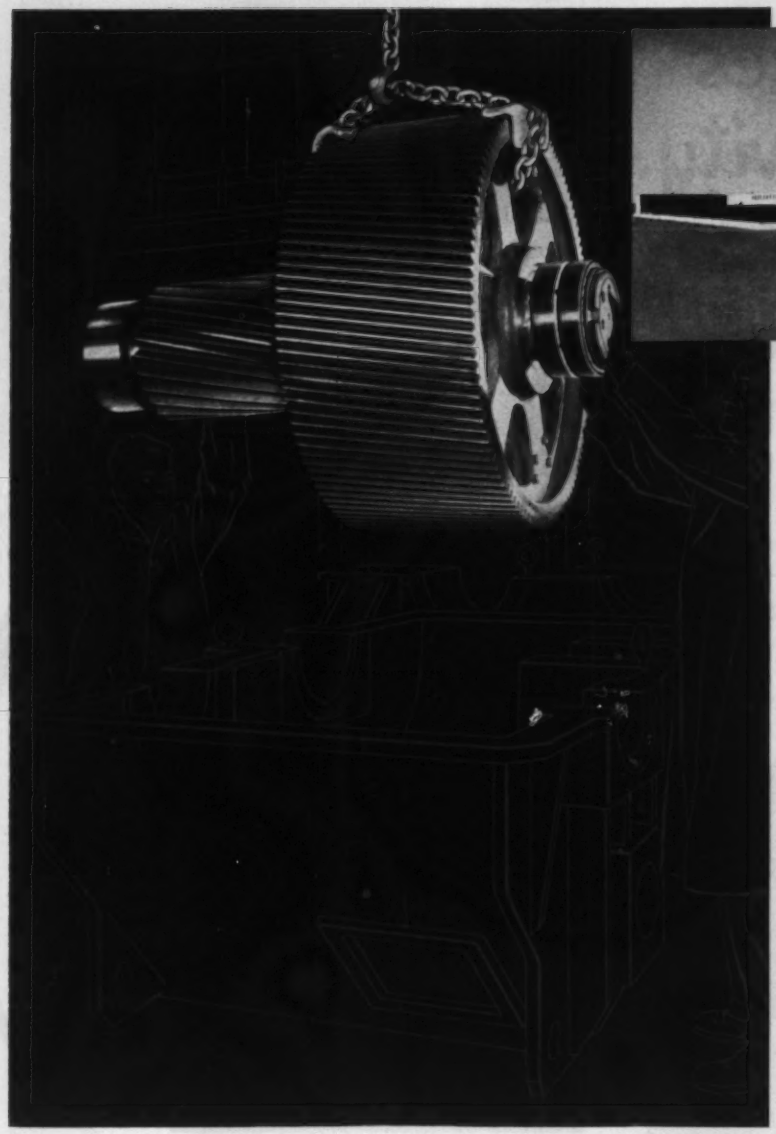

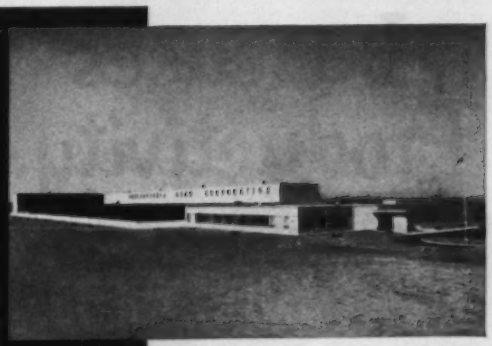

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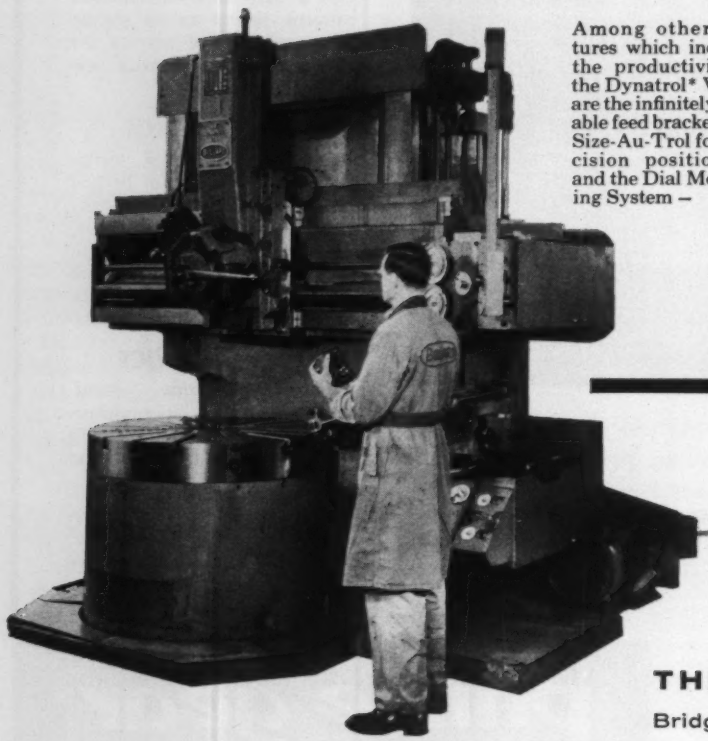
Directional control of all head motions in feed on traverse, either horizontally, vertically or at any 45° angle, as well as table start and stop from a lightweight portable pendant, is a distinct production advantage.



Among other features which increase the productivity of the Dynatrol* V.T.L. are the infinitely variable feed bracket with Size-Au-Trol for precision positioning, and the Dial Measuring System –

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THE BULLARD COMPANY
Bridgeport 9, Conn., Telephone EDison 6-2511

YOU CAN'T BEAT A BULLARD

Replacement Sales

(Millions of units)

	Mufflers	Tail Pipes
1960	24	20
1958	26	23
1956	22	18
1954	19	15
1947	9	3

Sources: Adapted from Census of Manufacturers and survey of muffler makers.

How Long Mufflers Last*

(Average life in thousands of miles)

Conventional	18,000
Zinc Coated	32,000
Aluminized	34,000
Ceramic Coated	90,000**

*Consensus of manufacturers' estimates as surveyed by STEEL.
**Based on preliminary test data.

Ceramic Prolongs Muffler Life

A CERAMIC coated exhaust system that will last as long as the average car will be introduced on all 1961 Ramblers at no extra cost to the buyer, American Motors Corp. announces.

Muffler manufacturers are going to be unhappy if other carbuilders follow AMC's lead and adopt ceramic coated mufflers and tail pipes. Nobody doubts the ceramic jobs will last longer. The fear seems to be they may last too long and slice into replacement sales which have already been crimped. Muffler sales are dropping as 1956 and '57 cars with costly dual exhausts head for used car lots.

• **Attack** — Muffler producers are saying they can't see that the added life is worth the extra cost. They charge that the ceramic "cans" will be too noisy and the coating will chip and crack off. There's a veiled threat that the two firms supplying AMC may find their other muffler markets drying up. Another observation: It's just an AMC sales gimmick which will be dropped in time. There's already some evidence that Ford Motor Co. is trending away from the aluminized muffler it touted so highly last year.

• **Rebuttal**—But those mutterings don't seem to bother the muffler designer, Walker Mfg. Co., Racine, Wis., nor do they concern Bettinger Corp., Milford, Mass., developer of the ceramic coating system. It all fits into Mr. Romney's philosophy that cars don't have to fall apart after three years or 70,000 miles.

Says E. W. Bernitt, vice president of AMC's auto operations: "Although the process is more expensive, the development is in line with our basic policy of greater product durability, quality, and serviceability. Corrosion has been a severe problem, both in the automobile body itself and in major components. We feel that our body dip process and the ceramic exhaust system are major advances in product life and service."

• **History**—Ceramic mufflers aren't new. Bettinger originally developed its process for the aircraft trade. Ceramic systems are used on J-79

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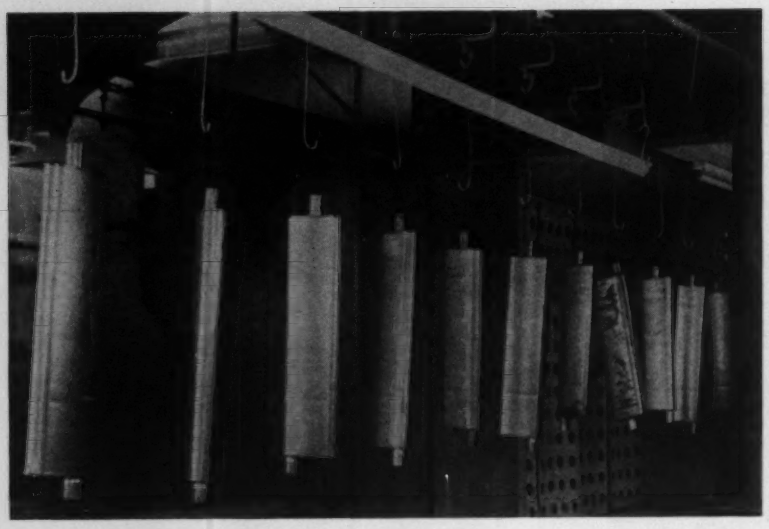


Pilot production run of mufflers ready for firing at high temperatures. Fused-in coating of ceramic material is 0.003 to 0.004 in. thick

and J-59 jet engines. Several truck manufacturers have used a type of refractory coating on different exhaust system parts for ten years.

• **New Design**—AMC, Walker, and Bettinger claim their ceramic coated unit avoids two earlier design problems, noise and cracking. Only the interior shell assembly is coated with ceramic. The zinc coated outer cover is added later so extra drain holes that could cause noise can be plugged up.

In addition, Walker has redesigned the muffler so the corrosive liquid condensate formed as a combustion byproduct doesn't pile up at "cold spots" in the muffler. A system of venting baffles diverts it back over the natural "hot spots" in the tubes so it will evaporate faster.

• **Process**—In making the muffler, Walker fabricates the inner shell assembly in its Jackson, Mich., plant. Low carbon, cold rolled steel is used. Headers are 18 gage; baffles and the inner shell are 20 gage. The assemblies are shipped to Bettinger's Toledo, Ohio, plant for coating. They're flash annealed at 1500° F to burn off oils and grease. Units are then cycled through seven or nine pickling tanks to clean and etch the steel.

Assemblies then move on a continuous conveyor line into the dip tank for coating. The ceramic solution is aqueous and consists of refractory materials, boron silicates, titanium dioxide, clays, and several other common inorganic materials. The specific gravity of the solution is controlled through 15 minute checks to make sure just the right amount adheres to the steel.

As muffler shells come out of the dip tank, they move onto a drying turntable where they're stood on end. A network of 150 to 200 drier tubes push a controlled flow of hot air through each unit to evaporate excess water out of the coating. The mechanism looks something like a king-sized beauty parlor. Temperatures are controlled in 15 degree increments within a 150 to 300° F range, so the coating won't become so dry it slides off the metal.

Parts are transferred from the drying rack to an overhead conveyor which takes them through a gas drier that's an integral part of the three zone firing furnace. Mufflers go from room temperature to more than 1500° F in a few minutes before they move into second zone of the furnace where the ceramic is fused to the steel. Coating thickness ranges 0.003 to 0.004 in. Bettinger says it will withstand severe thermal and mechanical shocks, possibly even better than aluminized steel mufflers. Shock tests have been conducted at 1200, 1300, and 1400° F.

Coated units are returned to Walker's Jackson plant where a layer of asbestos and the 25 gage steel outer cover are applied. More than 100 spotwelds are needed for a complete muffler assembly. Tail pipes are given a similar ceramic coating, then they're shipped to Rambler's Wisconsin assembly plants right from Toledo instead of first being returned to Walker.

• **Comparisons** — Cost and service life are hard to come by, but the industry figures the ceramic jobs are roughly a buck more than aluminized or zinc coated mufflers, which, in turn, are 60 to 90 cents more costly than carbon steel mufflers, depending on production volume.

• **Outlook**—What the AMC move means to the replacement market isn't clear, but it's unlikely that other carmarkers will be eager to assume the extra cost. Says Paul Putman, president, AP Parts Corp., Toledo: "You get to a point of diminishing returns on cost versus life. It looks like the aluminized mufflers are a good balance for most volume carbuilders right now." Compacts may have to switch though if Rambler continues to dominate that market. Its sales so far are 27 per cent ahead of where they were the last fiscal year.

Muffler replacements are big business. STEEL's chart is based on census of manufacturers' data for 1947 and 1956, projected against registrations—37.3 million in 1947 vs. 72 million this year.

U. S. Auto Output

Passenger Only	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
5 Mo. Totals	3,200,845†	2,726,017
May	615,640*	546,817
June	.....	557,995
July	.....	555,410
August	.....	239,149
September	.....	258,151
October	.....	507,527
November	.....	254,527
December	.....	494,931
Total	.....	5,593,707
Week Ended	**1960**	**1959**
Apr. 30	135,515	118,059
May 7	142,091	134,763
May 14	145,917	135,856
May 21	154,755	133,568
May 28	144,092†	117,372
June 4	120,000*	125,186

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Ed Weiner, president, talks with Ed Lebowitz, right, Chesterfield's superintendent, by one of the firm's three Wean Equipment slitting lines.

Chesterfield Steel relies on speed, accuracy, durability of Wean coil processing lines

Fast delivery—when, where, and how the customer wants it—is the metal warehouse's stock-in-trade. And Ed Weiner, president of Cleveland's Chesterfield Steel Service Co., is proud of the firm's record for on-time, "on-spec" deliveries of strip and sheet steel, nonferrous and coated metals.

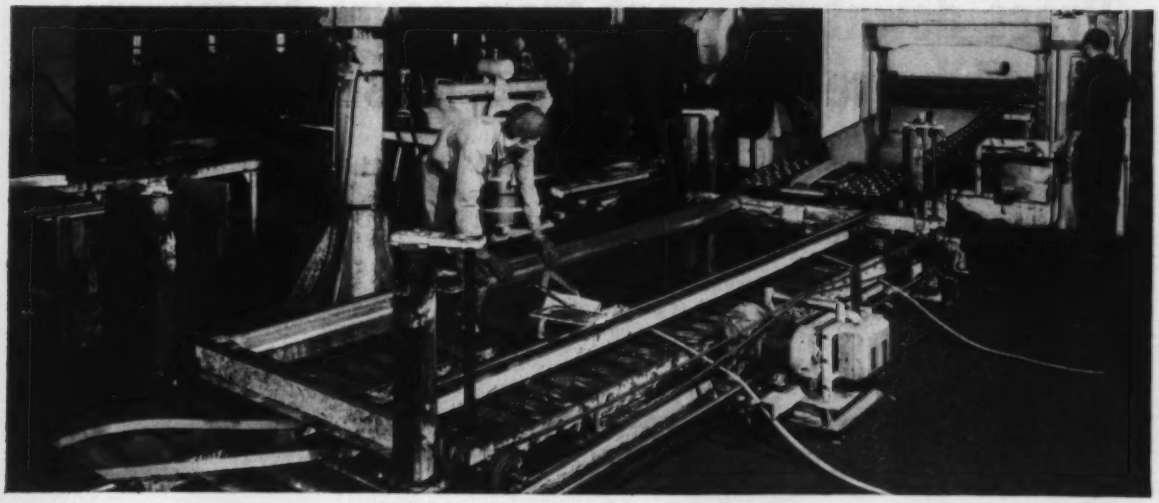
To maintain this reputation for service, Chesterfield needs equipment that will maintain its accuracy under tough, 3-shift, week-long operation. That's why this progressive firm has installed three Wean slitting lines and the 52″ Wean flying shear line shown below . . . and is ordering another flying shear line for 60″ wide strip. Most of the firm's orders for sheet material pass through this coil processing equipment, making both speed and reliability of operation vital. Mr. Weiner notes that the Wean 52″ flying shear line has doubled sheet production over other types of lines previously used by Chesterfield.

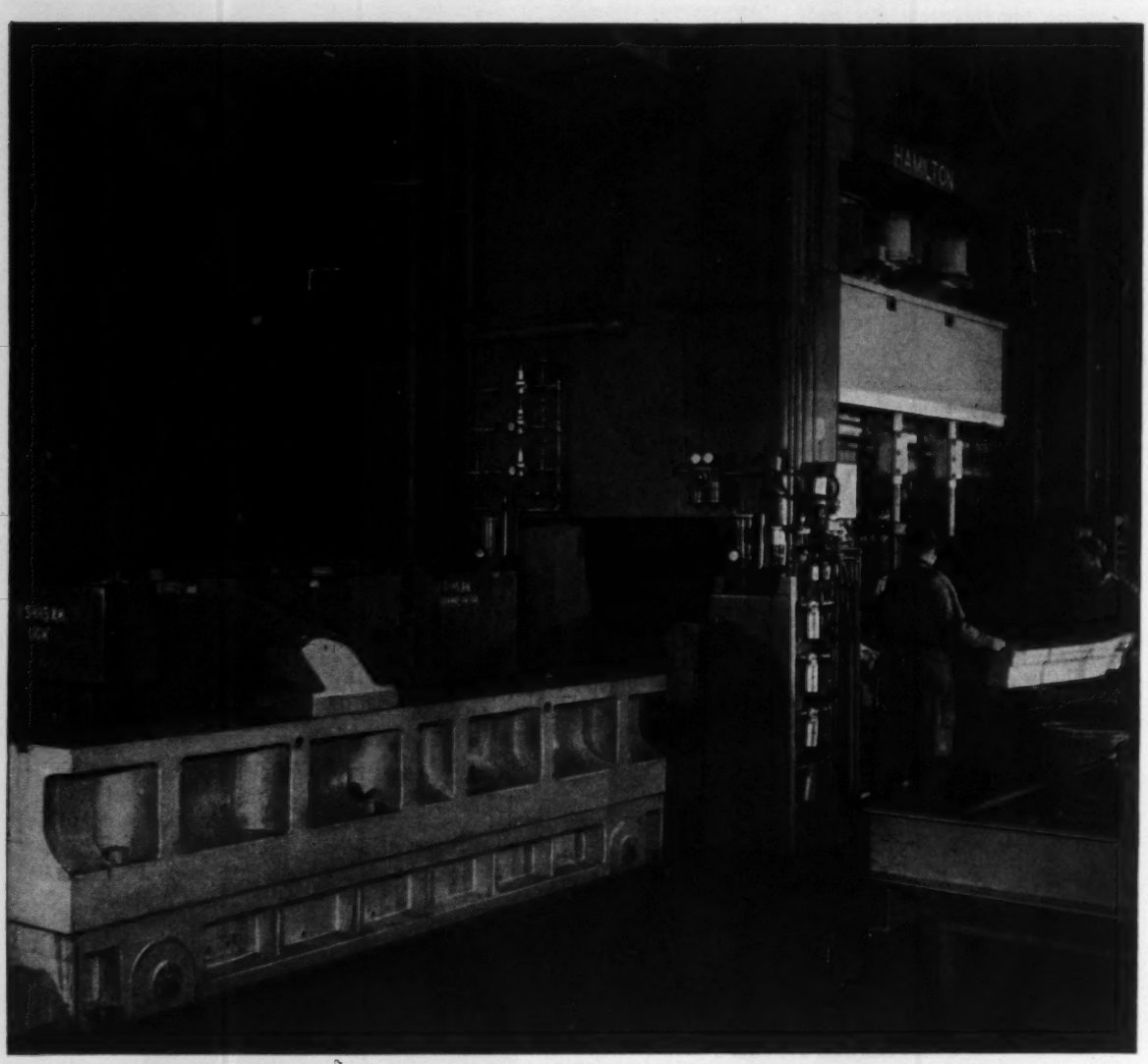
Like Chesterfield, Wean has established a reputation as one of the most knowledgeable firms in the field of coil processing and has built equipment that is now serving many of the country's largest metalworking firms. Write for a brochure covering the important savings *you* can realize from coil processing.

WEAN EQUIPMENT CORPORATION
22800 Lakeland Boulevard
CLEVELAND 17, OHIO

WEAN

Wean flying shear line has elevating run-out conveyor and side guides which adapt to pack height.





Dual-bolster design permits tooling up of one bolster (left) while press is producing parts from die on the other. This press, at the A.O. Smith Corp., Milwaukee, Wis., has proved the economy of this design for the past 2 years.

Press downtime...cut from hours to minutes with the Hamilton dual bolster press

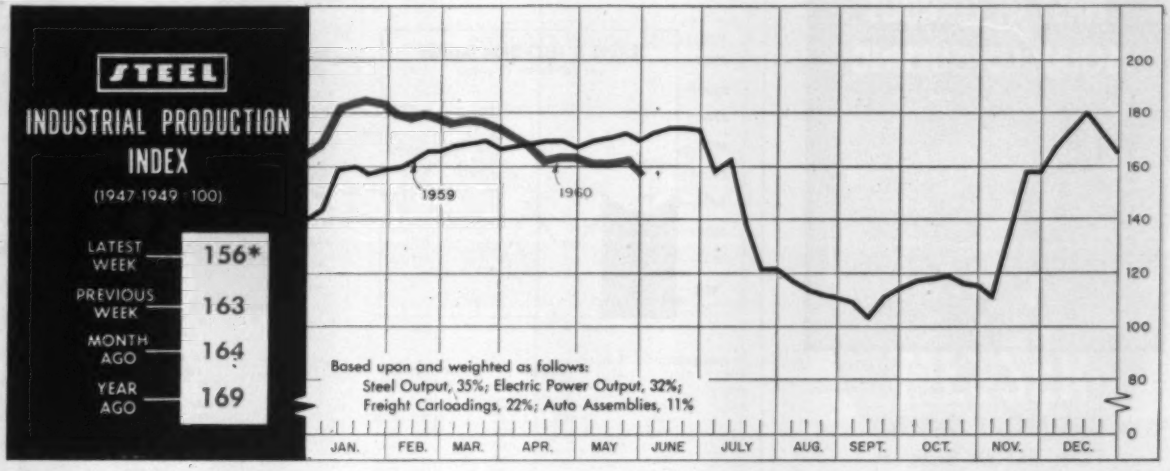
Hours — sometimes days — formerly wasted in changing dies can be used productively with the Hamilton sliding dual bolster press. While the operating bolster and die are turning out parts, the second bolster is being tooled up for the next production run. Push-button-controlled hydraulic motors position the standby bolster fast and surely for rapid startup and production of the next part — changeover time is a matter of minutes only.

A 1250-ton, 2-point, top-drive press equipped with two sliding bolsters installed at a Midwest automobile parts plant is proving the economies of this innovation—on parts up to 12 ft. long. Reduced parts inventory, meeting schedules on time, and fewer presses needed to accommodate frequent die changes are among the benefits resulting. For detailed information on the new Hamilton dual bolster press, write Dept. P-1.

BALDWIN · LIMA · HAMILTON

Industrial Equipment Division · Philadelphia 42, Pa.

BALDWIN BLH LIMA-HAMILTON



*Week ended May 28.

Building Uptrend Grows Stronger

FOR THE SECOND straight month, construction looks like it will breathe new life into the economy. Not only are the statistics improving, but the outlook is also firming up.

• **First, Awards**—Contracts for future construction, which will influence the trend of work put in place later this year, are keeping well ahead of the year-ago pace. Despite a relative decrease in the latest week, awards reported for the first 21 weeks of 1960 by *Engineering News-Record* are 8 per cent ahead of those in the similar period of 1959. The biggest factor in the week ended May 26 was a boost in highway contracts to the highest weekly total since December, 1958. For the year to date, highway contracts are 7 per cent ahead of the corresponding 1959 figure.

Despite a decline from the unusually high total of a year ago, private work increased its advantage for the year to date to 19 per cent.

April totals reported by F. W. Dodge Corp. also lead to the conclusion that construction will be a big factor in keeping 1960 on a high level of activity. Contracts worth $3,359,782,000 represented the second highest April in history, ranking behind the 1959 figure. But as Dr. George Cline Smith, chief economist for Dodge, explains: "Contracts in April, 1959, on a seasonally adjusted basis, were the highest for any month in history, so that a decline from this peak is hardly alarming.

"Moreover," he continues, "the recent trend is quite encouraging. The Dodge seasonally adjusted index (1947-49=100) has risen from 234 in February to 252 in March and now to 266 in April."

• **Second, Work in Place**—After declining for two months, the seasonally adjusted annual rate of work put in place in April leveled off at the March figure of $53.9 billion. Unadjusted, construction value

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,765[1]	1,870	2,653
Electric Power Distributed (million kw-hr)	13,350[1]	13,468	12,761
Bituminous Coal Output (1000 tons)	8,370[1]	8,195	8,499
Crude Oil Production (daily avg—1000 bbl)	6,800[1]	6,864	7,203
Construction Volume (*ENR*—millions)	$389.1	$498.0	$682.6
Auto, Truck Output, U. S., Canada (*Ward's*)	180,780[1]	193,865	153,618
TRADE			
Freight Carloadings (1000 Cars)	600[1]	637	688
Intercity Truck Tonnage (changes from year ago)	−4.8%	−3.6%	+18.3%
Business Failures (Dun & Bradstreet)	313	304	259
Currency in Circulation (millions)[3]	$31,684	$31,774	$31,473
Dept. Store Sales (changes from year ago)[3]	−1%	−2%	+9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,023	$28,366	$23,614
Federal Gross Debt (billions)	$288.6	$288.1	$285.8
Bond Volume, NYSE (millions)	$26.2	$32.4	$26.4
Stocks Sales, NYSE (thousands of shares)	15,976	19,725	14,873
Loans and Investments (billions)[4]	$102.9	$102.7	$102.7
U. S. Govt. Obligations Held (billions)[4]	$25.8	$25.7	$31.5
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	231.2	230.8	222.0
All Commodities[7]	119.8[1]	119.8	119.5
Commodities Other than Farm & Foods[7]	128.4[1]	128.4	127.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,844,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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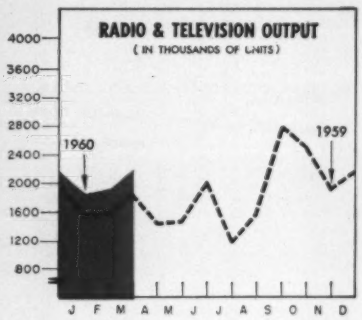
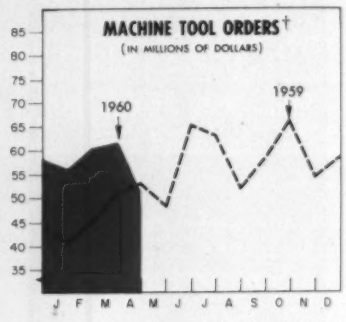
THE BUSINESS TREND





	Radio		Television	
	1960	1959	1960	1959
Jan.	1,356	1,125	526	437
Feb.	1,442	1,125	503	460
Mar.	1,668	1,348	550	494
Apr.	....	1,040	...	389
May	....	1,040	...	432
June	....	1,430	...	571
July	....	829	...	350
Aug.	....	1,009	...	547
Sept.	....	1,981	...	808
Oct.	....	1,796	...	707
Nov.	....	1,346	...	561
Dec.	....	1,553	...	593
Totals	....	15,622	...	6,349

Electronic Industries Association.
Charts copyright, 1960, STEEL.

	New Orders (000)		Shipments (000)	
	1960	1959	1960	1959
Jan.	56,450	41,050	46,400	31,300
Feb.	60,600	45,400	51,950	36,050
Mar.	61,950	51,550	64,500	45,750
Apr.	51,650*	53,200	55,350*	45,000
May	.....	48,700	.....	41,000
June	.....	65,400	.....	50,050
July	.....	63,400	.....	40,600
Aug.	.....	52,200	.....	40,300
Sept.	.....	58,850	.....	46,150
Oct.	.....	66,650	.....	51,500
Nov.	.....	54,250	.....	46,600
Dec.	.....	58,300	.....	63,850
Totals	.....	658,950	.....	538,150

†Metal cutting and metal forming.
*Preliminary.
National Machine Tool Builders' Assn.

jumped to $4.5 billion, the highest monthly total since last October. A slightly greater than usual increase in public construction projects offset a less than usual rise in the private residential sector. Construction outlays for the first five months of 1960 are now only 2 per cent under the corresponding total for record 1959.

• **Third, Outlook**—For the rest of this year, F. W. Dodge expects a gradual uptrend in the building industry. Officials still see total contract awards at about $35.9 billion for the year, only 1 per cent below the peak established last year. Since the deficit for the first four months was 8 per cent, they see the trend turning up sharply over the rest of year.

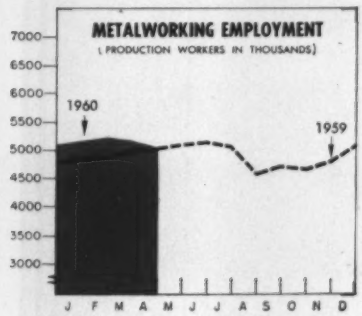
"The chief factor in the recent decline, namely housing, seems to be at or near the bottom of its downward path and by midyear may well be in a rising trend once again." They feel that 1.24 million housing starts in 1960 is "fairly reasonable." The easing of the money market and favorable government action on FHA down-payment requirements should help considerably.

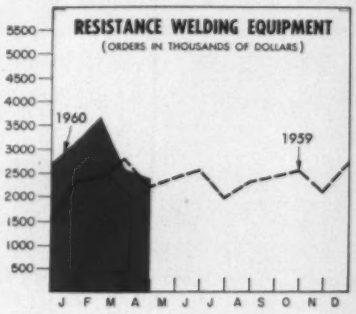
"With the downward pressures of housing subsiding, the continued strong showing in the nonresidential building category will begin to have more of an effect in boosting the level of total construction awards," the officials declare. Industrial and educational buildings are setting the pace in the nonresidential category. Highway contracts, currently the second largest segment of the industry, is showing renewed strength and should improve as the year progresses.

Economy to Rise Gradually

Dodge economists feel that when we leave fancy and get down to facts, 1960 to date is "far from depressing." They point to the record gross national product of slightly more than $500 billion in the first quarter; industrial production at just below the all-time peak set in January; an increase of about 6 per cent in consumer spending; and a sharp pickup in auto sales.

"As we see it, most economic indicators will continue to edge up gradually in the months ahead, with total output of goods and services for the year as a whole reaching some $509 billion, or 6 per cent above the 1959 level . . . When





1959	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Apr.	1,037	840	1,126	803	1,229
May	1,051	853	1,153	814	1,233
June	1,067	866	1,167	833	1,224
July	1,038	847	1,149	836	1,207
Aug.	628	815	1,138	849	1,132
Sept.	611	841	1,167	888	1,200
Oct.	602	812	1,147	893	1,208
Nov.	975	800	1,136	882	1,026
Dec.	1,039	841	1,166	892	1,172
1960					
Jan.	1,048	857	1,179	892	1,239
Feb.	1,052	863	1,191	890	1,245
Mar.	1,041	854	1,192	881	1,221
Apr.*	1,016	837	1,187	862	1,178

U. S. Bureau of Labor Statistics.

	Net Orders		Shipments	
	1960	1959	1960	1959
Jan.	3,258	2,396	1,582	1,427
Feb.	3,732	2,457	2,563	1,889
Mar.	2,653	2,811	3,011	2,179
Apr.	2,446	2,258	2,943	2,193
May	....	2,407	....	2,019
June	....	2,597	....	2,702
July	....	1,980	....	2,269
Aug.	....	2,322	....	2,928
Sept.	....	2,435	....	2,113
Oct.	....	2,599	....	2,097
Nov.	....	2,131	....	1,597
Dec.	....	2,768	....	2,353
Totals	....	29,161	....	25,766

Resistance Welder Manufacturers' Assn.

the final totals are in, 1960 will have been, on the average, the most prosperous year in our history."

Buyers Concur on Trend

Purchasing agents, while not quite as confident, see an uptrend in business in the last half. Although "1960 looked better in 1959 than it does after five months of 1960," 39 per cent of the reporting members of the National Association of Purchasing Agents said in the latest business survey that this year so far has been everything they expected it to be. Eight per cent say it is even better than anticipated.

Forty seven per cent believe the second half will be better than the first, while only 14 per cent think it will be worse. The remainder look for a continuation of the current business level.

But Not All Will Share

But the year almost certainly will be characterized by an unevenness of prosperity among industries and even among companies within industries. For example, the agricultural implement industry is not faring so well. Oliver Corp. reported a drop of about one-half in net income during the quarter ended Apr. 30. And Deere & Co. says sales in its first half (ended Apr. 30) were off 15 per cent from the 1959 record pace. Cessna Aircraft Co. has laid off about 700 workers in recent weeks, partly because of a decline in the farm equipment field. (Cessna makes parts for the industry.)

However, Alva W. Phelps, chairman and president of Oliver, feels that rising farm income and volume deferred during the bad winter and spring weather will boost its second half volume above the year-ago level. But President William A. Hewitt of Deere, reports that his operations are still based on the assumption that sales in entire fiscal 1960 will be moderately less than they were in 1959.

Trends Fore and Aft

- Output of radios and TV sets in March was significantly above totals in both the previous month and the year-ago period. (See table and graph, Page 74.)
- The weekly average for failures is 302 firms vs. 296 during the comparable period of 1959, reports Dun & Bradstreet Inc.

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Clothes are dried efficiently in the famous Maytag "Halo of Heat" automatic dryer. And now the quality of the "Halo of Heat" dryer is even better than ever because its unique circular heating element is fastened quickly, securely by 22 special Tinnerman SPEED CLIPS developed by joint efforts of Tinnerman and Maytag designers.

Each one-piece SPEED CLIP eliminates a separate welding operation on the "Halo of Heat" assembly. Various screw-driving operations formerly required on Maytag's assembly line to capture the ceramic insulator and secure the mounting clamp were also eliminated, with equally interesting reductions in cost. Now, the stainless steel, vibration-proof fastener is snapped in place with simple "button-hook" action. No special skills or equipment are required. Assembly and parts costs have been reduced... *substantially!* Serviceability in the field has been improved.

A free Tinnerman Fastening Analysis of your own product can show you where similar assembly and cost-saving advantages are possible. Call your Tinnerman representative—he's listed in the Yellow Pages under "Fasteners". Or write to:

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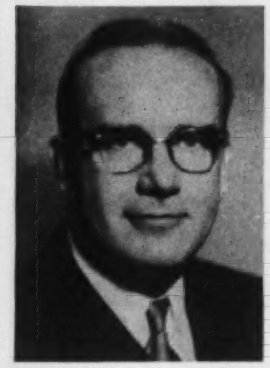


FRANK W. CHAMBERS
Strategic Materials pres.

JAMES P. KNEUBUHL
Research-Cottrell pres.

RUSSELL C. O'KANE
Buckeye Steel Castings pres.

HAROLD A. NEFF
Holo-Krome v. p.-gen. mgr.

Frank W. Chambers, executive vice president, was elected president of **Strategic Materials Corp.**, New York. **John C. Udd**, former president, was elected chairman to succeed **Samuel D. Lunt** who remains on the executive committee.

James P. Kneubuhl was elected president of **Research-Cottrell Inc.**, Bound Brook, N. J. He succeeds **J. William Hinkley** who continues as chairman, and also as president of the parent organization, Research Corp., a foundation. Mr. Kneubuhl was vice president at Fluor Corp. Ltd., Los Angeles.

J. A. Grundy, vice president-operations, Reed Roller Bit Co., was also made general manager of its **Cleco Air Tools**, division in Houston. Sales posts for Cleco include: **E. G. Clark**, regional manager for Newark, N. J., Detroit, and Chicago divisions; **J. G. Hudson**, regional manager for Houston, Atlanta, St. Louis, and Los Angeles divisions; **R. V. Gillispie**, named manager of sales development.

C. J. Moore, general sales and marketing manager of Exide Industrial Div., Philadelphia, **Electric Storage Battery Co.**, was promoted to vice president-marketing for the division.

Tube Distributors, California Inc., Los Angeles, appointed **Edwin A. Raymond** general manager.

William R. Knowles was made sales manager, **Hershey Metal Products**, Derby, Conn. He was with New Britain Machine Co. as sales manager for its Precision Products Div.

Russell C. O'Kane was elected president and general manager, **Buckeye Steel Castings Co.**, Columbus, Ohio. He succeeds **Frank H. Bonnet**, president and general manager since 1948, who was elected chairman. **William W. Heimberger**, former works manager, was elected vice president-operations. **George T. Johnson Jr.**, former Southeastern sales representative, was made vice president-sales.

Louis Polk Jr. was appointed vice president-operations, **Sheffield Corp.**, Dayton, Ohio, subsidiary of Bendix Corp. He was assistant vice president and operations manager.

James G. Gelder was made general manager, **Diamond Electronics Div.**, Diamond Power Specialty Corp., Lancaster, Ohio. He was marketing manager.

John P. Holt, former market development manager at Basic Inc., Cleveland, joined **Valley Dolomite Corp.**, St. Louis, as director of research and development, a newly created post.

William C. Ray was named general manager, Battery Div., **Electric Autolite Co.**, Toledo, Ohio.

Albert M. Garbade, former vice president, was elected president of **United States Manganese Corp.**, owned by Vitro Corp. of America, Sheer-Korman Associates, and Great Divide Mining & Milling Corp. of which Mr. Garbade is president. He succeeds **Frank B. Jewett Jr.**, resigned because of pressure of other duties. Mr. Jewett is president of Vitro Corp. of America.

Harold A. Neff was elected vice president and general manager, **Holo-Krome Screw Corp.**, Hartford, Conn. He has been a vice president since 1946.

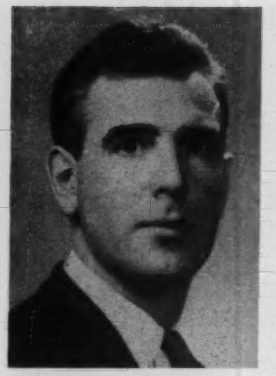
Harry D. Feltenstein Jr. was elected president and chief executive officer of **Lithium Corp. of America**, which moves executive and sales offices from Minneapolis to New York June 20. Production facilities of the company are moved to Bessemer City, N. C., where research and development laboratories will be relocated during June and July. **Herbert W. Rogers**, former president, fills the new post of chairman and remains in Minneapolis.

Chrysler Corp., Detroit, appointed **John D. Moran** director of purchasing administration services; **Richard D. Morrison** purchasing agent for materials and services purchasing. Mr. Moran has been director of purchasing programing since 1957. Mr. Morrison was made purchasing agent-raw materials last November.

William Goldman was made research supervisor, engineering equipment, for **Keuffel & Esser Co.**, Hoboken, N. J. **John M. Shodron** was made Midwest regional manager, headquarters Chicago.

John Kranaskas was made chief chemist, Metals & Alloys Div., **Tennessee Products & Chemical Corp.**, subsidiary of Merritt-Chapman & Scott Corp. He is located in Rockwood, Tenn.

A. H. Sonnenschein was made director of planning, **Polarad Elec-**



MICHAEL G. SENDZIMIR
T. Sendzimir Inc. pres.

WILLIAM J. KAESTNER
Vanadium market research

WALTER E. GREGG
Crucible v. p.-tech.

DAVID A. WILLIAMS
new post at Standard Steel

tronics Corp., Long Island City, N. Y.

Michael G. Sendzimir, vice president-general manager, **T. Sendzimir Inc.,** Waterbury, Conn., was appointed president to succeed **Tadeusz Sendzimir,** now chairman. **Andrew T. Romer** was made vice president, **Stefan Jedrzejewski** sales manager.

Aluminum Co. of America, Pittsburgh, appointed **Robert T. Ferguson** technical manager of pig and ingot sales, and **Frederick C. Irving Jr.** technical manager of casting sales. **John C. Churchill** was made manager of the Oklahoma City, Okla., branch sales office succeeding **J. Raed Patterson,** recently named assistant manager of Alcoa's New York district sales office.

W. D. Cowgill was appointed general sales manager, **Cleveland Graphite Bronze Div.,** Clevite Corp., Cleveland. He has been Detroit district sales manager for the last eight years.

William J. Kaestner was appointed manager, market research, for **Vanadium Corp. of America.** He previously served as staff assistant-sales. **Thomas R. Burgin** was made assistant manager of market research. Both are located in New York.

Walter E. Gregg was elected vice president-technology, **Crucible Steel Co of America,** Pittsburgh. Former director of technology, he assumes the post vacated last October when **Maurice J. Day** became vice president-commercial. Mr. Gregg will direct research, product, and process development, as well as metallurgical, patent and license activities.

Frank J. Kenney was made sales manager, **Lapointe Machine Tool Co.,** Hudson, Mass. He was assistant sales manager.

K. Russell Knoblauch was made market sales manager for the Philadelphia-based Industrial Products Group, **Minneapolis-Honeywell Regulator Co.** He was chemical industry market manager.

David A. Williams was appointed director of research and development for **Standard Steel Corp.,** Los Angeles. He is succeeded by **Leon F. Howard** as director of engineering, Cambridge Div., Lowell, Mass. The research and development department has just been established to develop new products and processes in the field of cryogenics. Standard Steel was recently licensed by National Research Corp. for use of NRC-2 cryogenic insulation for both ground support and flight applications.

Glen T. Cahill was named administrative assistant at **Hamilton Foundry Inc.,** Hamilton, Ohio. He joined the firm last June, and previously was with Armco Drainage & Metal Products Inc.

Charles W. Lockhart was appointed vice president-sales, **Buffalo Forge Co.,** Buffalo. He was sales manager, Air Handling Div.

Richard F. Macey was made assistant manager, tin mill products sales,

W. D. COWGILL
CGB gen. sales mgr.

FRANK J. KENNEY
Lapointe sales manager

K. RUSSELL KNOBLAUCH
M-H IPG market sales mgr.

CHARLES W. LOCKHART
Buffalo Forge v. p.-sales

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3-1852

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Angelus 8-4291

MILWAUKEE 10, WIS.
Hilltop 5-7430

MINNEAPOLIS, MINN.
Tuxedo 1-4109

NEWARK, NEW JERSEY
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New York: Digby 4-9460

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Locust 7-5129

PITTSBURGH 24, PENNA.
Museum 2-2410

PORTLAND 9, OREGON
Capitol 7-1404

ROCHESTER 4, NEW YORK
Locust 5250

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Jackson 4-4040

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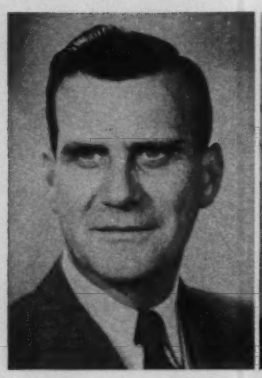


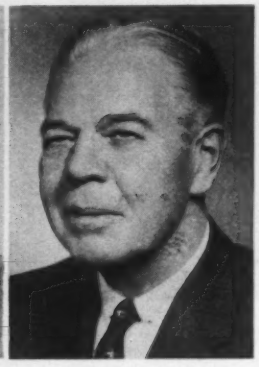
ROBERT J. LINNEY
Reserve Mining president

ROBERT G. LAMBERT
J&L production planning

ORLA MADSEN
Herrick Mfg. chief eng.

JOHN H. TINNEMEYER JR.
Pittsburgh Coke & Chemical post

MARSHALL J. EVANS
Alan Wood Steel post



SEYMOUR S. JACKSON
Kennecott Copper v. p.-adm.

for U. S. Steel Corp.'s **Tennessee Coal & Iron Div.** at Birmingham.

John H. Tinnemeyer Jr. was named superintendent of blast furnaces at the Neville Island (Pittsburgh) plant of **Pittsburgh Coke & Chemical Co.** He was assistant superintendent.

Alan Wood Steel Co., Conshohocken, Pa., named **Marshall J. Evans** general manager of primary product sales. He was manager of sand and stone sales.

Charles E. Heitman Jr., former president, Carter Carburetor Div., ACF Industries Inc., joined the staff of **G. E. Stoll**, executive vice president of **Bendix Aviation Corp.**, South Bend.

Paul G. Garrity was made vice president-marketing, **Landers, Frary & Clark**, New Britain, Conn.

William P. Burke was made assistant to the president of **Caine Steel Co.**, Chicago.

Seymour S. Jackson fills the new post of vice president-administration, **Kennecott Copper Corp.**, New York. He has served the company since 1954 as counsel.

In **Westinghouse Electric Corp.'s** General Products Group, Pittsburgh, **W. J. Delaney Jr.** was named executive assistant to **W. W. Sproul Jr.**, vice president and group general manager. **Edwin H. Seim** succeeds Mr. Delaney as manager of the X-Ray & Industrial Electronics Div. at Baltimore.

Marvin H. Grove was named chairman of the executive committee and appointed to the new post of chief executive officer of **Walworth Co.**, New York. Mr. Grove is also president of the subsidiary, Grove Valve & Regulator Co.

James F. Sweeney was elected executive vice president, **Struthers Wells Corp.**, Titusville, Pa. **I. S. Brumagim** was named vice president-sales; **Paul Ristau** vice president-manufacturing.

Robert J. Linney was elected president, **Reserve Mining Co.**, Silver Bay, Minn., jointly owned by Republic Steel Corp. and Armco Steel Corp. He was executive vice president.

Robert G. Lambert was appointed co-ordinator, production planning control procedures for **Jones & Laughlin Steel Corp.**, Pittsburgh. He succeeds **Walter L. Moore**, recently named director of J&L's Commercial Research Dept.

Orla Madsen was made chief engineer, **C. B. Herrick Mfg. Corp.**, Cleveland. He was electrical engineer. His new responsibilities include both electrical and mechanical.

Robert D. Beatty Jr. was appointed a staff representative on special assignments with **Eaton Mfg. Co.**, Cleveland. He was president of Manor Die Cast Corp. which was sold last November. Mr. Beatty has since been an engineering consultant.

Oscar W. Underwood III was named assistant to the president of **Rust Engineering Co.**, Pittsburgh, replacing **Crawford J. Cofer**, assigned other duties.

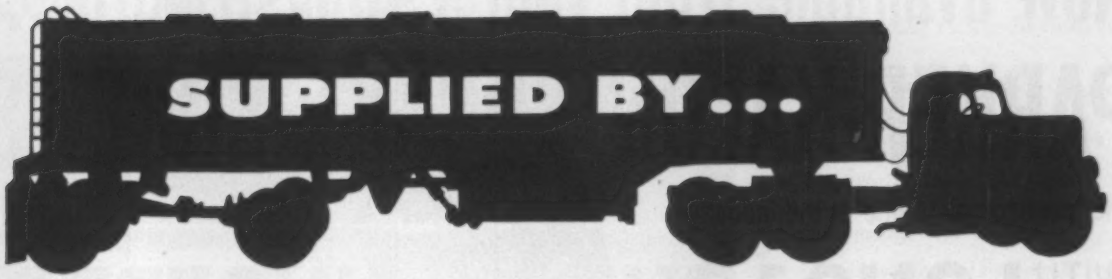
Cleveland Crane & Engineering Co., Wickliffe, Ohio, is enlarging its Engineering Dept. staff. It appointed **Roy Dehn** director of engineering; **Chester G. Reed** chief engineer-crane production; **Franklin W. Dunning** chief engineer-crane development; **Willard A. York** chief engineer, Cleveland Tramrail Div. production; **Harry A. Cotesworth** chief engineer, Cleveland Tramrail development; **Alfred W. Schultz** chief engineer, Steelweld Press Div.

Glenn M. Herring was made assistant to vice president-sales, **Hanson-Van Winkle-Munning Co.**, Matawan, N. J. He continues as manager of the Eastern sales district.

OBITUARIES...

Guy M. Slade, 60, chief metallurgist for the Lackawanna, N. Y., plant of **Bethlehem Steel Co.**, died May 21.

A. J. Krantz, 86, a director of Empire-Reeves Steel Corp., Mansfield, Ohio, and retired president of **Reeves Steel & Mfg. Co.**, Dover, Ohio, died May 17.



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the most complete line in the industry

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When design and production specify socket screws with self-locking inserts...ask your distributor to show you the Parker-Kalon line with the new Long-Lok feature.

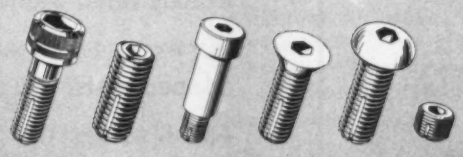
P-K socket screws with Long-Lok inserts of Polycap, a nylon type polymer, completely eliminate the need for lock washers or intricate safety wiring. They are ideal for use where frequent adjustment is a requirement . . . for thread-sealing applications...for extra holding power, even when subjected to severe vibration.

- Excellent performance over a wide range of temperature.
- No reduction in basic rated strength of the fastener.
- Meets requirements of MIL F 18240A (ASG) and NAS 1081 specifications.

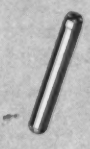
to fill all your requirements . . .

call on your Parker-Kalon distributor for P-K socket screws with or without the Long-Lok insert. You can order either way and get speedy delivery of P-K quality-controlled socket head cap screws (1960 and 1936 series), set screws (including P-K's new W-Point*†), shoulder screws, flat heads, button heads and pipe plugs.

ASK YOUR P-K DISTRIBUTOR FOR SAMPLES AND TECHNICAL BULLETIN NO. 862



LOOK TO P-K for all your socket screw, dowel pin and hex key requirements. Ask your distributor to show you the five new Hex Key sets, now available from P-K in addition to the popular #45 and #111 sets.



*T.M. †U. S. Patent No. 2,907,245

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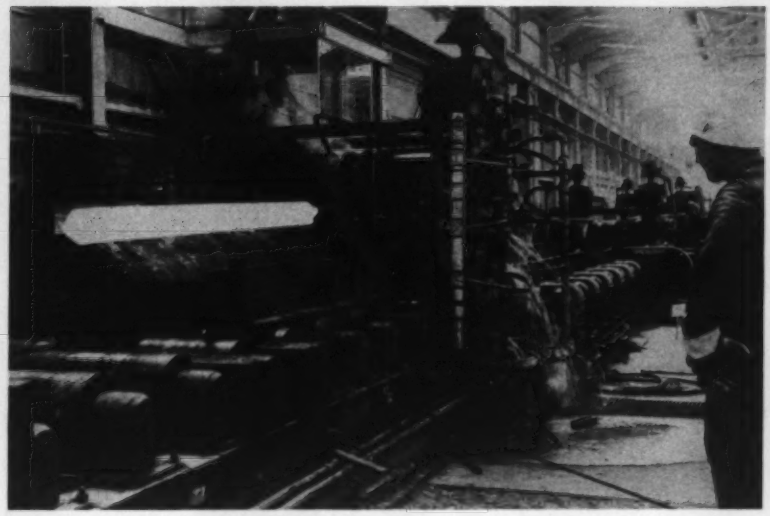
Ceco Steel Integrates



White hot ingot moves from reheating furnace to roughing stand preparatory to further passes through automated rolling equipment in new, $12 million Ochiltree Works. Annual capacity: 180,000 tons

CECO STEEL Products Corp., Chicago, has strengthened its position as a manufacturer and distributor of structural steel products used in the building industry with its new steel mill, the Ochiltree Works, at Lemont, Ill. It is now an integrated company, from raw material to the erection of finished building components on job sites.

Ceco's $12 million steel mill became operative late last year. It was engineered and constructed by Rust Engineering Co., Pittsburgh. Annual capacity is 180,000 tons.

Since the company uses about 300,000 tons of steel a year, it continues to buy some of its finished steel from outside sources.

Facilities at the Ochiltree Works include an electric melt shop, consisting of three electric furnaces, 12 ft in diameter, lined with basic brick. Each furnace has a rated scrap melting capacity of 20 tons per heat. The three can turn out 21.91 tons of steel an hour.

The steel bar rolling mill has a two-zone furnace to reheat ingots. Mill roughing stands include one, 20 in., three high; two, 16 in., two high; and one, 14 in., two high. Intermediate rolling stands are 12 in., four stand continuous, two high; two, 14 in., two high looping; and one, 12 in., two high looping. Finish rolling stands are 12 in., two high; 10 in. vertical; and 10 in., two high. Maximum finishing speed is 2000 fpm.

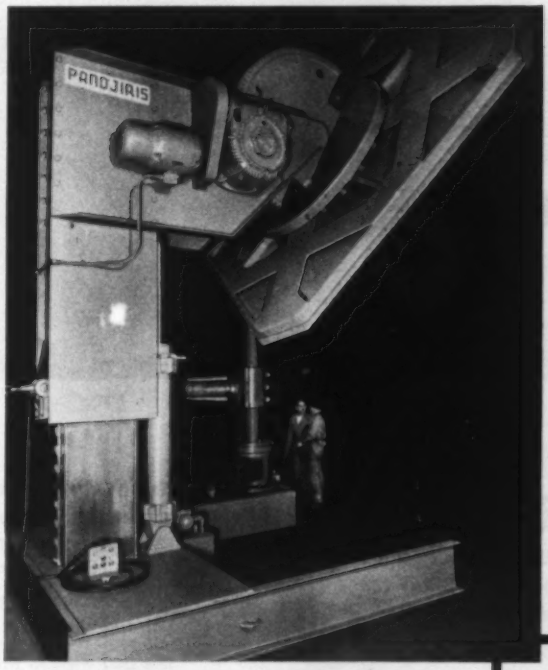
The company's three divisions and products are:

- Structural Products Div., concrete reinforcing bars, steel forms and shores, steel joists, and roof deck.
- Window & Door Div., steel and aluminum windows, curtainwalls, metal screens, and steel doors.
- Merchant Trade Div., metal roofing, standard steel buildings, roofing accessories, metal lathing products, and related items.

Will Process Coated Scrap

Wisconsin Metal & Chemical Corp. has been organized in Milwaukee to process tin plate and galvanized scrap metal for the recovery of tin and zinc. The firm will build a 20,000 sq ft plant at 8300 W. Florist Ave. and expects to start operations by mid-August. The plant will be able to process 200,000 tons of scrap a year, half tin plate and half galvanized scrap. The recov-

(*Please turn to Page* 86)



Position of the work is mighty important when welding. This 20-ton capacity positioner tilts, rotates and elevates automatically. Two standard Cone-Drive **double-enveloping worm** gear reducers provide the drive and tuck away compactly under the table.

Compact Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

Put 20 tons where you want it

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Lights, camera, action

National Tube tests USS National Electric-Resistance Welded Pressure Tubing with sound waves. This ultrasonic weld inspection process is tougher than a Hollywood screen test.

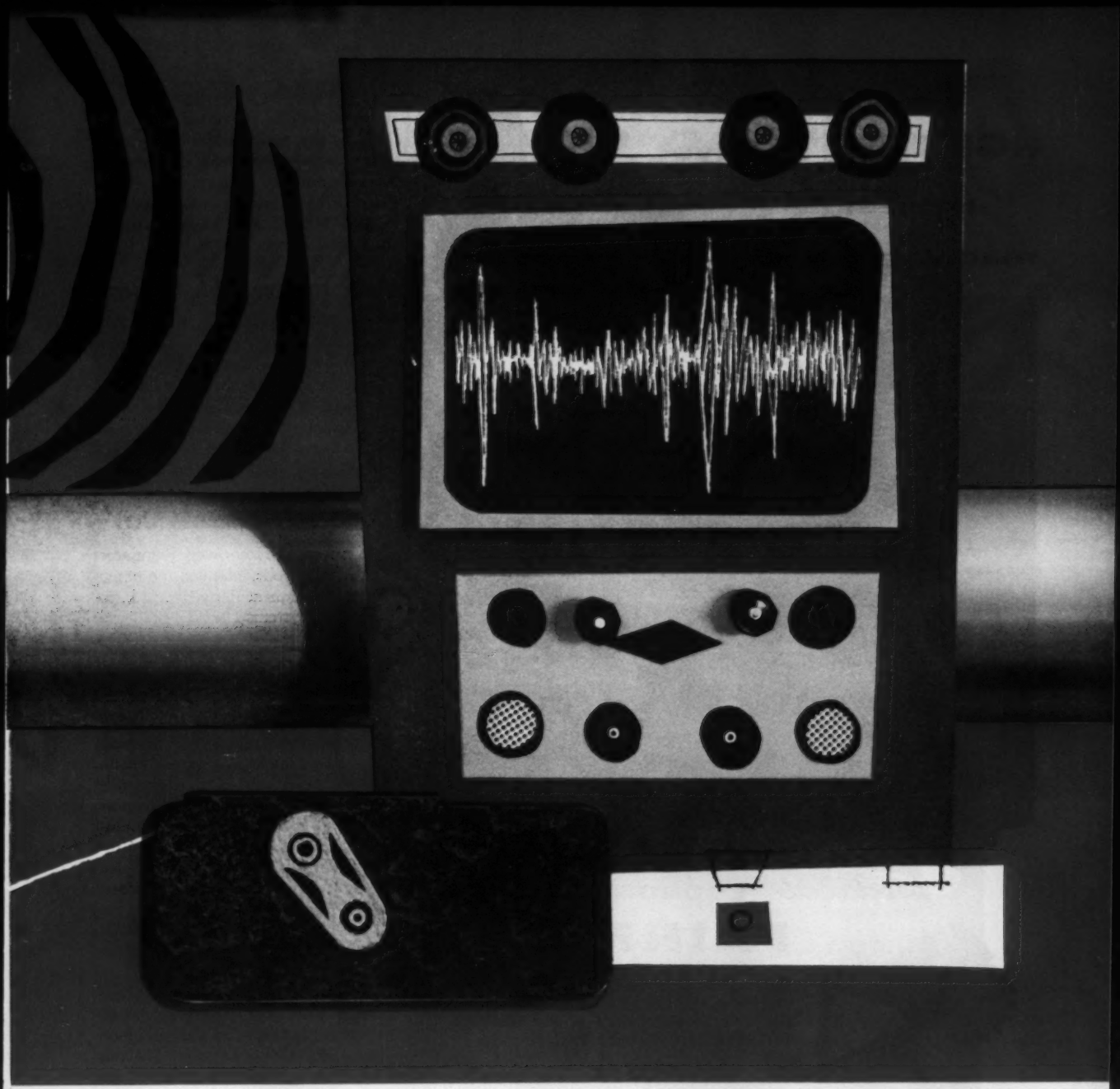
As the tubing slides directly over a ground quartz crystal, electrical pulses are focused on the weld area. The crystal changes these pulses into ultrasonic vibrations which bounce off the weld and reflect its strength or weakness. The vibrations are speared by the crystal, converted back into electrical energy, and floated across an oscilloscope screen.

If a bad weld is reflected, the electrical current dances wildly on the screen and triggers an alarm system. The crooked pattern is pen-recorded on a graph, a bullfrog-voiced horn croaks loudly, and the tubing is squirted with black paint to mark the defect.

In case the ultrasonic unit breaks down, a red-faced dome

Steel

This mark tells you a product is made of modern Steel.



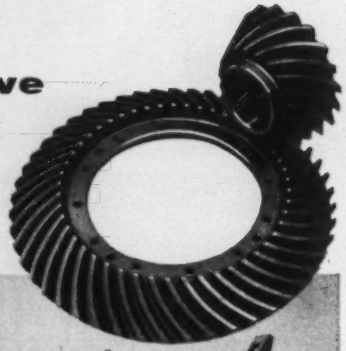
light automatically flashes, revolves and winks at the weld inspector. This blushing signal tells him that the unit needs to be repaired. It's added insurance that every length of tubing is completely tested before it leaves the plant.

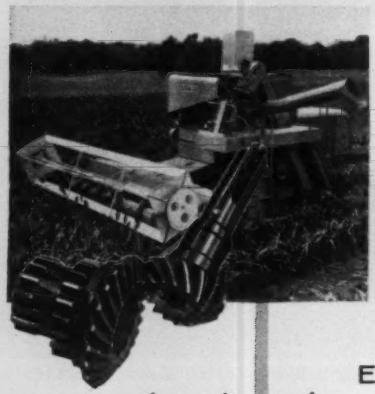
Our inspection techniques are rigid. But they help us develop a high quality product for use in applications such as boilers, heat exchangers, condensers, superheaters, economizers and other types of heat transfer equipment. Consider USS National Electric-Welded Tubing for your next installation. Our trained Mill Service Force is available for field consultation. Write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. *USS and National are registered trademarks*

National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York
United States Steel Supply Division

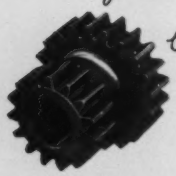
GEARS to drive newest machines...

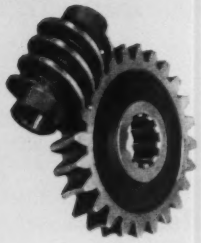




produced EFFICIENTLY, ECONOMICALLY *by*

FAIRFIELD





Getting into production on new models and new machines often calls for quick action to meet desired time schedules. FAIRFIELD CAN HELP YOU!

As one of America's largest independent producers of GEARS and DIFFERENTIALS, Fairfield's facilities are complete. You get the benefits of newest high capacity machines coupled with regular big volume output in an ultra-modern plant designed exclusively for producing fine gears EFFICIENTLY, ECONOMICALLY. Check with Fairfield NOW on your gear requirements. *Call or write.* FAIRFIELD MANUFACTURING COMPANY, INC., 2313 S. Concord Rd., Lafayette, Indiana. Telephone 2-7353.

Gears and Differentials Made to Order for:

TRACTORS • HEAVY DUTY TRUCKS • AGRICULTURAL MACHINERY • POWER SHOVELS AND CRANES
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

(*Concluded from Page 83*)

ered tin will be converted into pure tin and dry powdered tin oxide; the recovered zinc, into zinc compounds and chemicals. Officers are: President, P. A. Kimmel; vice president, Ralph Mason; and secretary-treasurer, Joel Kimmel.

AMP to Invest $6 Million

American Metal Products Co., Detroit, will spend more than $6 million for tooling and other equipment to increase the manufacture of truck axle housings. The new automated equipment (it'll go into production in mid-1961) will include mechanical handling devices.

Honeywell Renames Div.

Minneapolis-Honeywell Regulator Co., Minneapolis, changed the name of its operation at Beltsville, Md., to Industrial Systems Div.

Gets Steel Mill Contract

United Engineering & Foundry Co., Pittsburgh, has been awarded an order for a universal slabbing mill, a four stand tandem cold mill, and a temper pass mill. The mills will be installed in the new Spencer Works of Richard Thomas & Baldwins Ltd., Llanwern, Monmouthshire, England. They are scheduled to go into production in September, 1961.

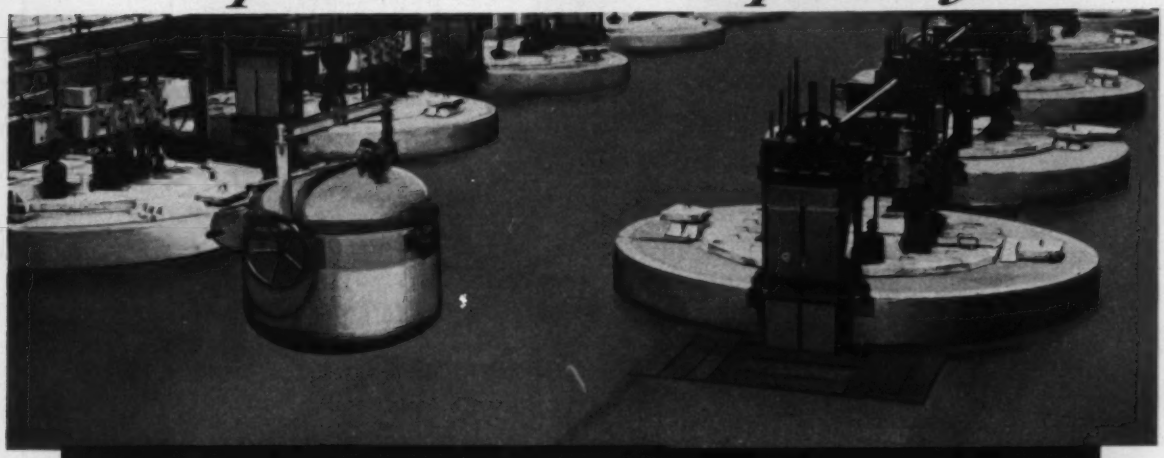
Reactive Metals Formed

National Distillers & Chemical Corp., New York, has acquired 60 per cent interest in the common stock of Mallory-Sharon Metals Corp. and will integrate with it the operations of its subsidiary, Johnston & Funk Metallurgical Corp. The combined operation will be known as Reactive Metals Inc. and will be headed by Raymond A. Quadt. Sharon Steel Corp. owns a 40 per cent interest in Reactive Metals.

The assets of Reactive Metals Inc. exceed $50 million. The company will continue to produce special metals (such as zirconium and titanium mill products) and columbium, hafnium, molybdenum, tantalum, tungsten, and vanadium mill products.

Officers will include: Chairman and chief executive officer, Austin

Now Prompt Shipment of Aluminum 99.992+% Pure ... Largest Producer Triples Plant Capacity

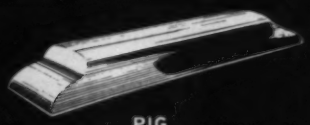


Super purity Aluminum is finding rapidly increasing demand in the metal-working industries because of its marked superior ductility, chemical stability and reflectivity.

This demand brought a 200% plant expansion at Aluminum Foils, Inc., the largest producer of super purity aluminum in America.

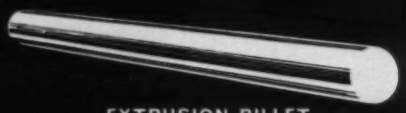
AFI super purity aluminum is known as Raffinal® and, when alloyed for strength, as Reflectal®.

If you would like to explore possible uses of Super Purity Aluminum, please mail the coupon.



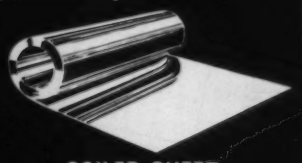
PIG

For varied industrial uses. Other forms are also supplied.



EXTRUSION BILLET

Requires up to 15% less pressure in impact extruding.



COILED SHEET

For highest reflectivity, greatest corrosion resistance.

Among the largest uses are for: automotive and boat trim, hardware, corrosion resistant containers, reflectors and in metals refining and alloying where control of impurities is critical.

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33 South Clark St.
Chicago, Ill.

Meadows Building
North Central Exp.
Dallas, Texas

2962 Grandview
Atlanta, Ga.

ALUMINUM FOILS, INC.
Jackson, Tenn.
Please send data on Super Purity Aluminum to:

Name_____

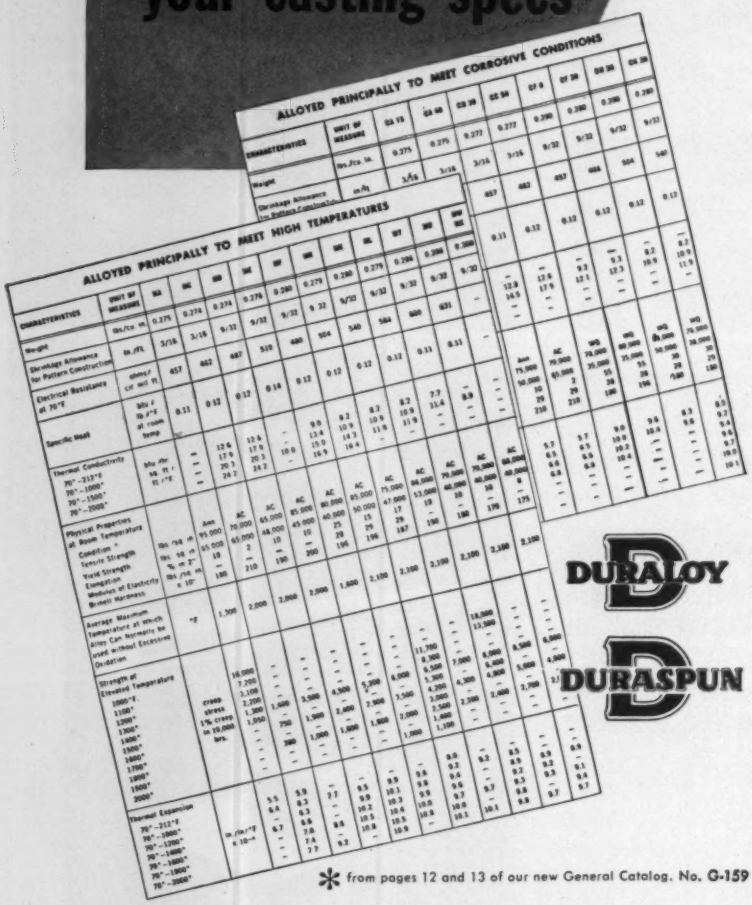
Company_____

Address_____

City_____ State_____

POSSIBLE USE_____

TABLES to help you select the proper alloy for your casting specs



ALLOYED PRINCIPALLY TO MEET CORROSIVE CONDITIONS

CHARACTERISTICS	UNIT OF MEASURE	CA 15	CA 40	CA 28	CA 6A	CF 8	CF 3M	CN 7M	CN 3M
Weight	lb./cu. in.	0.275	0.275	0.272	0.272	0.280	0.280	0.280	0.280
Shrinkage Allowance for Pattern Construction	in./ft.	3/16	3/16	3/16	3/16	9/32	9/32	9/32	9/32
Electrical Resistance at 70°F	ohms/cir. mil ft.	457	462	457	457	482	457	504	540
Specific Heat	btu/lb/°F at room temp.	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Thermal Conductivity 70°–212°F	btu per sq. ft./in./°F	—	12.6	12.6	—	11.1	—	—	—
70°–1000°F		—	17.9	17.9	—	12.9	—	—	—
70°–1500°F		—	20.3	20.3	—	14.5	—	—	—
70°–2000°F		—	24.2	24.2	—	—	—	—	—
Physical Properties at Room Temperature Condition		Ann	AC	AC	AC	AC	AC	AC	AC
Tensile Strength	lbs./sq. in.	85,000	70,000	65,000	85,000	80,000	85,000	75,000	86,000
Yield Strength	lbs./sq. in.	45,000	65,000	48,000	45,000	40,000	50,000	47,000	53,000
Elongation	% in 2"	30	2	10	10	25	15	17	10
Modulus of Elasticity	lbs./sq. in. x 10⁶	—	210	—	—	29	29	29	29
Brinell Hardness		180	196	196	200	196	196	187	190
Average Maximum Temperature at Which Any Can Remain in Load without Excessive Oxidation	°F	1,700	2,000	2,000	2,000	1,800	2,100	2,100	2,100
Strength at Elevated Temperature 1000°F	creep 1% creep in 10,000 hrs.	10,000	—	—	—	—	—	11,700	8,000
1100°F		7,500	—	—	—	—	—	8,500	5,500
1200°F		2,250	—	—	—	—	—	5,300	3,500
1300°F		1,500	1,600	—	—	4,500	6,000	4,200	2,500
1400°F		1,000	750	—	—	2,400	2,500	3,000	1,600
1500°F		350	390	—	—	1,000	1,000	2,500	1,100
1600°F		—	—	—	—	—	—	1,600	1,100
1700°F		—	—	—	—	—	—	—	—
1800°F		—	—	—	—	—	—	—	—
1900°F		—	—	—	—	—	—	—	—
2000°F		—	—	—	—	—	—	—	—
Thermal Expansion 70°–212°F	in./in./°F x 10⁻⁶	5.5	5.9	7.7	—	5.5	6.0	6.0	6.0
70°–400°F		6.4	6.3	—	—	5.9	6.3	6.2	6.2
70°–600°F		—	6.6	—	—	6.2	6.6	6.4	6.4
70°–800°F		6.7	7.0	—	—	6.6	7.0	6.5	6.5
70°–1000°F		—	7.4	—	—	6.8	7.4	6.7	6.7
70°–1200°F		—	7.7	—	—	7.0	7.7	6.9	6.9
70°–1400°F		—	—	—	—	—	—	7.1	7.1
70°–1600°F		—	—	—	—	—	—	7.3	7.3
70°–1800°F		—	—	—	—	—	—	7.5	7.5
70°–2000°F		—	—	—	—	—	—	7.7	7.7

DURALOY

DURASPUN

* from pages 12 and 13 of our new General Catalog. No. G-159

— and there's lots more useful information about high alloy castings in our up-to-date catalog describing Duraloy Service. SEND FOR YOUR COPY.

As one of the pioneers in both static (1922) and centrifugal (1931) high alloy castings, we have a wealth of experience to focus on your high alloy casting problem. Send for our catalog, study it, and then let us help you get the best alloying combination to solve your corrosion, high temperature and/or abrasion problem.

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.

CHICAGO OFFICE: 332 South Michigan Avenue

DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

R. Zender; president, R. A. Quadt; and vice president-administration, E. J. Cronin Jr.

Bliss Buys Salem Building

E. W. Bliss Co., Canton, Ohio, purchased an office building at 520 S. Ellsworth Ave., Salem, Ohio, to serve as headquarters for its Rolling Mill Div. G. Perrault Jr. is vice president in charge of the division.

NEW OFFICES

Stainless & Strip Div., Jones & Laughlin Steel Corp., Detroit, opened a sales office at 1150 Sibley Tower Bldg., Rochester 4, N. Y. Resident salesmen J. R. Round and P. J. Murphy will handle mill sales of sheets, strip, bars, and wire produced at the division's plants.

Kaiser Steel Corp., Oakland, Calif., opened a sales office at 405 S. Main St., Salt Lake City, Utah. D. B. Brunson is sales representative.

NEW PLANTS

Reynolds Aluminum Supply Co., Atlanta, is building a 38,000 sq ft plant at Jacksonville, Fla. The building will house more than $250,000 worth of metals and building products. Stanford Davidson is branch manager. The company is affiliated with Reynolds Metals Co., Richmond, Va.

White Truck Div., White Motor Co., Cleveland, opened new Cincinnati branch headquarters at Spring Grove and Station Avenues. Norman G. Schacht is branch manager.

Industrial Stainless Steels Inc., Cambridge, Mass., purchased a 20,000 sq ft warehouse at 2025 Electric Ave., Blasdell, N. Y. The stainless steel service center will be managed by John B. Schweizer. Industrial Stainless is a subsidiary of Eastern Stainless Steel Corp., Baltimore.

Atlantic Steel Co., Atlanta, is constructing an $85,000 steel service center adjoining its present facility in Birmingham. The new section

Sundstrand drives run truck refrigeration compressors at constant speed regardless of engine or vehicle speed. Maintenance costs are slashed.

Millions of tons of perishable foods reliably protected by Sundstrand truck refrigeration drives

North, South, East, or West, fleet operators who are using Sundstrand refrigeration drives report superior performance and drastically reduced maintenance as compared to other types of compressor power sources.

The Sundstrand truck refrigeration drive system, product of Sundstrand Hydraulics, operates the refrigeration compressor at constant speed regardless of engine or vehicle speed, assuring uniform refrigeration at all times.

Sundstrand constant speed drive systems also are widely applied for driving generators on aircraft, condenser fans on bus air-conditioning systems, various mechanisms on construction equipment, and for propulsion of mobile industrial equipment. Complete information on request.

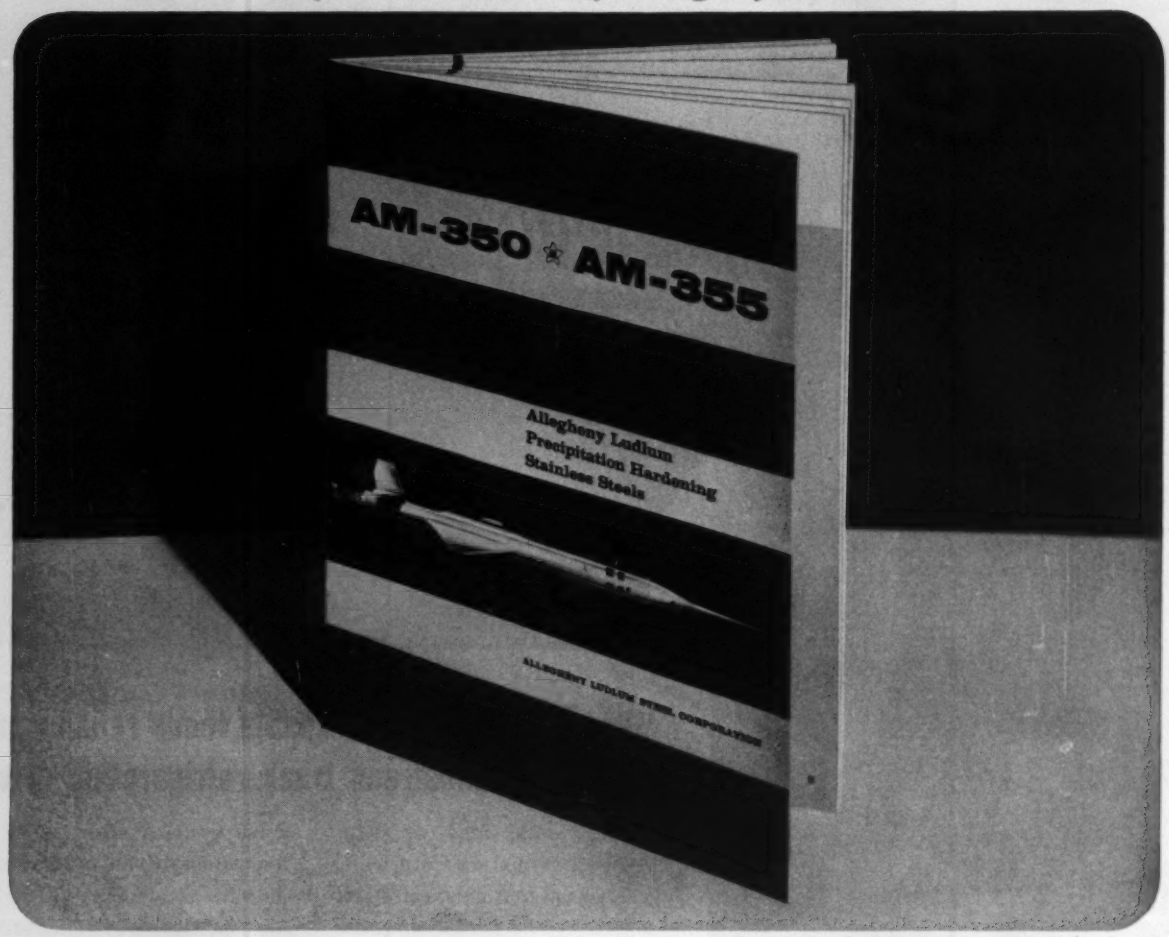
Other products of Sundstrand Rely-Ability include: pushbutton and numerically controlled machine tools, transfer machines, air and electric sanders, and specialties for metalworking and general industry.

SUNDSTRAND CORPORATION

ROCKFORD, ILLINOIS

SUNDSTRAND

***Experience**—the added alloy in* **Allegheny Stainless**



New booklet on A-L's precipitation-hardening stainless steels, AM-350 and AM-355

A tool for anyone interested in high strength-to-weight metals

In this technical booklet, you get the facts on Allegheny Ludlum's precipitation hardening stainless steels, AM-350 and AM-355, metals developed for space age requirements.

AM-350 and AM-355 combine these unusual qualities. They are easy to fabricate. Have high strength-to-weight ratios at room and elevated temperatures combined with excellent resistance to corrosion.

The physical and mechanical properties of the two metals are described in 33 charts and tables. Included are heat-treatment and fabrication data, eight photomicrographs and a section on corrosion resistance with representative values in selected environments.

It's jam-packed with data. For your free copy, see your A-L representative or write *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. S-6.*

955

ALLEGHENY LUDLUM

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

will contain 28,000 sq ft of floor space and will house cutting and burning facilities.

ASSOCIATIONS

American Iron & Steel Institute, New York, elected these officers: President, B. F. Fairless; executive vice president, Max D. Howell; vice president and secretary, G. S. Rose; vice president-research and technology, C. M. Parker; assistant vice president, Leo Teplow; assistant secretary, F. A. Coombs. Vice presidents are: W. M. Akin, Laclede Steel Co., St. Louis; Arthur B. Homer, Bethlehem Steel Co., Bethlehem, Pa.; and C. M. White, Republic Steel Corp., Cleveland. E. O. Sommer Jr., Keystone Steel & Wire Co., Peoria, Ill., is treasurer.

The institute elected three new honorary vice presidents: R. L. Gray, Armco Steel Corp., Middletown, Ohio; H. G. Hilton, Steel Co. of Canada Ltd., Hamilton, Ont.; and J. L. Mauthe, Youngstown Sheet & Tube Co., Youngstown.

Copper & Brass Research Association, New York, elected these officers: President, G. P. Bakken, Chase Brass & Copper Co., Waterbury, Conn.; senior vice president, E. P. Dunlaevy, Phelps Dodge Copper Products Corp., New York; and treasurer, F. L. Riggin Sr., Mueller Brass Co., Port Huron, Mich. Newly named vice presidents are: R. M. Stewart, American Brass Co., Waterbury; Lee Smith, National Copper & Smelting Co., Cleveland; J. F. Murray, Reading Tube Corp., New York; S. T. Williams, Scovill Mfg. Co., Waterbury; and R. H. Lewin, Cerro de Pasco Corp., New York. Re-elected vice presidents are: A. R. Zender, Bridgeport Brass Co., Bridgeport, Conn.; and D. T. Marvel, Western Brass Mills Div., Olin Mathieson Chemical Corp., New York. T. E. Veltfort is managing director; C. H. Pihl, secretary.

National Association of Architectural Metal Manufacturers, Chicago, elected these officers: President, J. M. Roehm, Kawneer Co., Niles, Mich.; vice president, Dr. Norman Bienenfeld, Alumiline Corp., Pawtucket, R. I.; vice president, Mitchel Stern, Camden Iron Works, Cam-

(*Please turn to Page* 94)

COWLES

slitting knives and special purpose metal working tools

● Complete line of slitting and trimming knives in our job-proved **Max-Cut, Specialloy, Superalloy, Circle C** and **Super C** grades for slitting any high or low carbon, stainless, silicon or non-ferrous material. Complete range of sizes. Prompt delivery. Also carbide rimmed knives. Our precision manufacture and exacting heat treatment assure sharp, clean cuts; and long, dependable service with only infrequent downtime for re-grinding. Wide experience in designing and manufacturing Chopper Blades, Roll Forming tools and other special purpose tools for a wide variety of metal working operations.

Specify "Cowles" rotary knives and special tools for every job. They'll make your work easier—and cut your costs.

Scrap Chopper Blade

Roll Forming Tool

Roll Turning Plugs

Grooved Edging Roll

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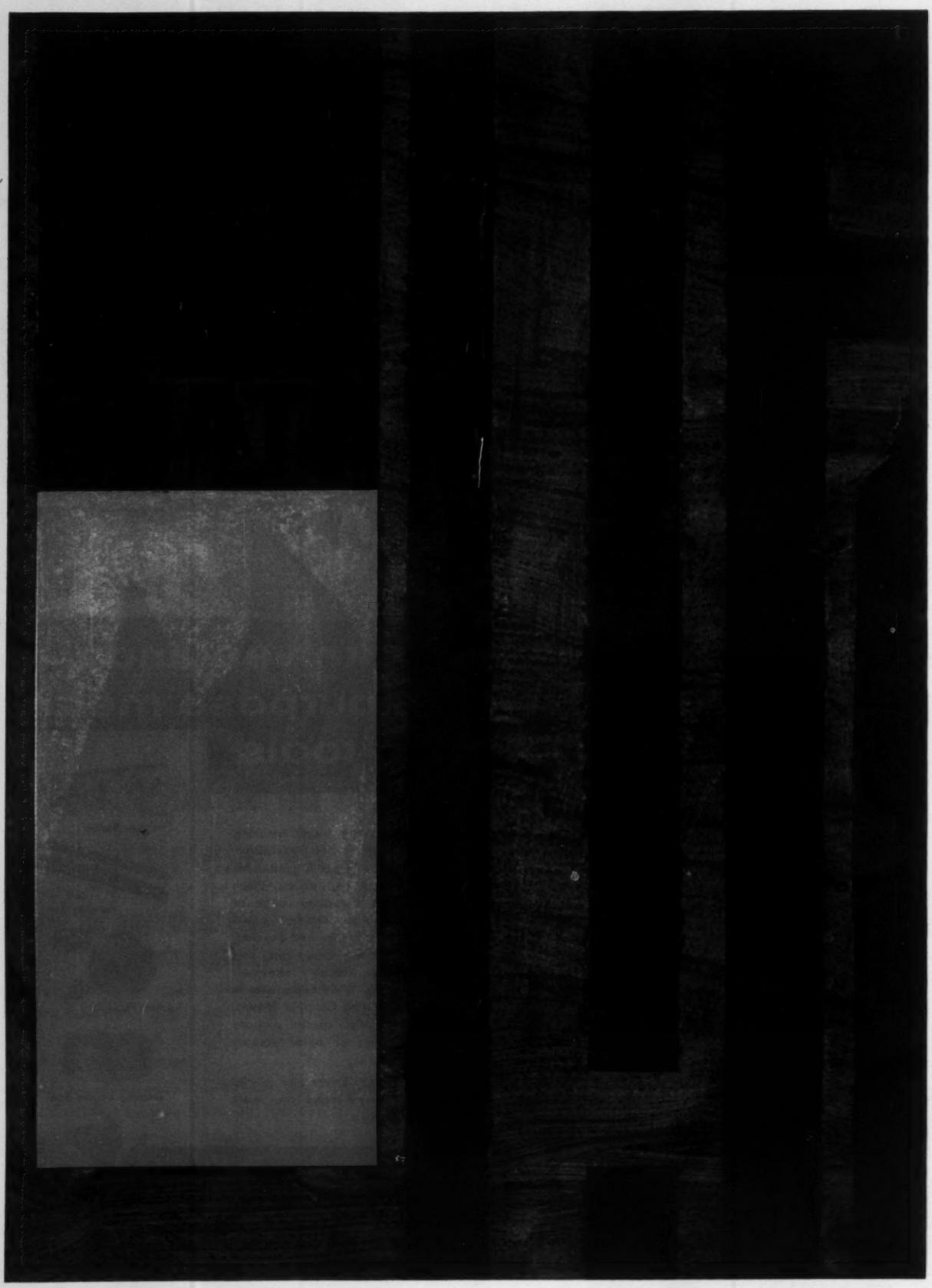


. . . . ANOTHER RECORD FOR FOUNDRY OPEN HEARTH BOTTOM PERFORMANCE USING PERMANENTE 165 RAMMING MIX

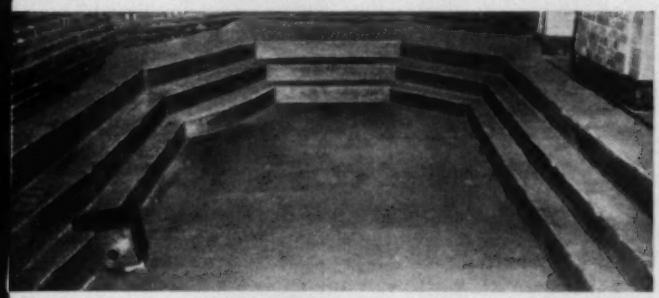
This outstanding performance record was recently established in the #7 furnace at General Steel Castings after switching to Permanente 165 for the foundry open hearth furnace bottom. The heats average 50–60 tons in the 80-ton capacity furnace. Normal fettling time is 20 minutes.

The furnace normally makes three types of steel: armor grade, Grade "A" (1020 steel) and nickel. With the Permanente 165 bottom, one type is made right after another without notable pickup of undesirable elements.

EXCEPTIONAL PERFORMANCE IS THE RULE

Operators who have switched to Permanente 165 Ramming Mix consistently report exceptional performance—whether for furnace bottoms, for new tapholes or for hot tapholes. Permanente 165 is made from high purity Kaiser Periclase refractory grains (95–96% MgO) and ceramically bonds itself into a crystalline mass at relatively low temperature—providing fast furnace availability.

This monolithic structure has exceptional volume stability, maximum resistance to hydration and to attack by iron oxide and slag. For furnace bottoms, its high density (averaging 175 pounds per cubic foot after firing) assures longer life. Make your own test and see how much more service you get with Permanente 165 Ramming Mix. Your Kaiser Refractories representative will be glad to help.



New Permanente 165 bottom in #7 O.H. furnace at the Granite City, Illinois, plant of General Steel Castings Corporation.

KAISER REFRACTORIES

Mexico Refractories Company Now Merged with Kaiser Refractories

Call or write Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc., at any of the offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
MEXICO, MISSOURI . . . . . Mex-R-Co Building
OAKLAND 12, CALIF. . . . . 300 Lakeside Drive

Ask to see the 30-minute color movie, "Progress in Modern Basic Refractories." Arrangements will be made by your Kaiser Refractories Sales Representative or Regional Office.

One of the outstanding advantages of Townsend Tuff Tite fasteners is that they provide an economical means for leakproof joining of metal, asbestos, porcelain or plastic. The pre-assembled conical neoprene washers flow into the holes as the fasteners are seated, filling them and making waterproof seals. Tuff Tites are effective for any application requiring leakproof joints, such as those needed in the construction or appliance industries.

Tuff Tite advantages include ease and economy of installation, surface protection and vibration resistance. Standard items are immediately available from jobbers and warehouses. Tuff Tites are also available in numerous special designs to suit any application need.

If you are joining metal, plastic, porcelain or asbestos, you should know about Townsend Tuff Tites. Ask your Townsend representative, or we will send you complete literature. Townsend Company, Engineered Fasteners Division, P.O. Box 71-C, Ellwood City, Pa.

Townsend Company

ESTABLISHED 1916

Engineered Fasteners Division

ELLWOOD CITY · PENNSYLVANIA

Chicago Steel Division · Santa Ana, California

In Canada: Parmenter & Bulloch Manufacturing Company, Limited, Gananoque, Ontario

(*Concluded from Page 91*)

den, N. J.; vice president, N. C. Dostal, Moynahan Bronze Co., Flat Rock, Mich.; vice president, K. F. Jorss Jr., A. F. Jorss Iron Works Inc., Arlington, Va.; vice president, E. P. Benson, A. J. Bayer Co., Los Angeles; secretary, H. S. Langland, Stanley Iron Works Inc., Minneapolis; and treasurer, E. M. Pollak, Illinois Bronze Works Inc., Chicago.

Magnesium Association, New York, elected these officers: President, C. A. Howe, Hills-McCanna Co., Chicago; treasurer, R. D. Ferguson, Bendix Foundries, Teterboro, N. J.; and executive secretary, Jerry Singleton. Vice presidents are: E. H. Perkins, Brooks & Perkins Inc., Detroit, and J. E. Pepall, Magnesium Co. of Canada, Montreal, Que.

CONSOLIDATIONS

J. M. Nash Co., Milwaukee, acquired **Peerless Machine Co.,** Racine, Wis., producer of metal sawing machines. New officers of Peerless which will operate as a subsidiary of Nash are: Chairman, Herman Jongebloed; president, Curtis Meyer; executive vice president, N. J. Fischer; treasurer, Frank Norris; and secretary, Richard McGinn.

American Metal Climax Inc., New York, purchased **Pyron Corp.,** Niagara Falls, N. Y., producer of iron powders. Expansion plans include the construction of a plant which will double the present capacity of about 7.5 million lb a year. Pyron will be part of American Metal Climax Inc.'s Amco Div. which produces nonferrous metal powders.

Electro-Tec Corp., South Hackensack, N. J., acquired **Lambros Precious Metals Co.,** New York, refiner and supplier of precious metals. The new property will be operated through Electro-Tec's recently established subsidiary, Precimet Laboratories Inc.

Garlock Inc. (formerly Garlock Packing Co.), Palmyra, N. Y., acquired **Chetron Corp.,** Los Angeles, and will operate the property as its Aircraft & Missile Div. Chetron specializes in plastics and Fiberglas fabrication for aircraft and missiles.

NOW HE KNOWS WHY

lubrication is a management responsibility

MANAGEMENT *does* have a stake in good lubrication practices.

If you recognize lubrication for what it is — a cost-reducing tool, not an expense item — you can effect savings that add up to many hundred times the cost of the lubricants themselves. Yet only management has the authority to make these potential savings an actuality. That's why lubrication is your responsibility. **Texaco can help you achieve these savings.** Texaco Lubrication Engineers have had valuable experience in tailoring Organized Lubrication Programs to the needs of virtually every industry. They can help show *you* the way to important savings. Why not talk to your nearest Texaco Lubrication Engineer today — or write for our new Book "Organized Lubrication — Major Cost Control Factor."

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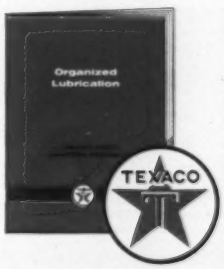
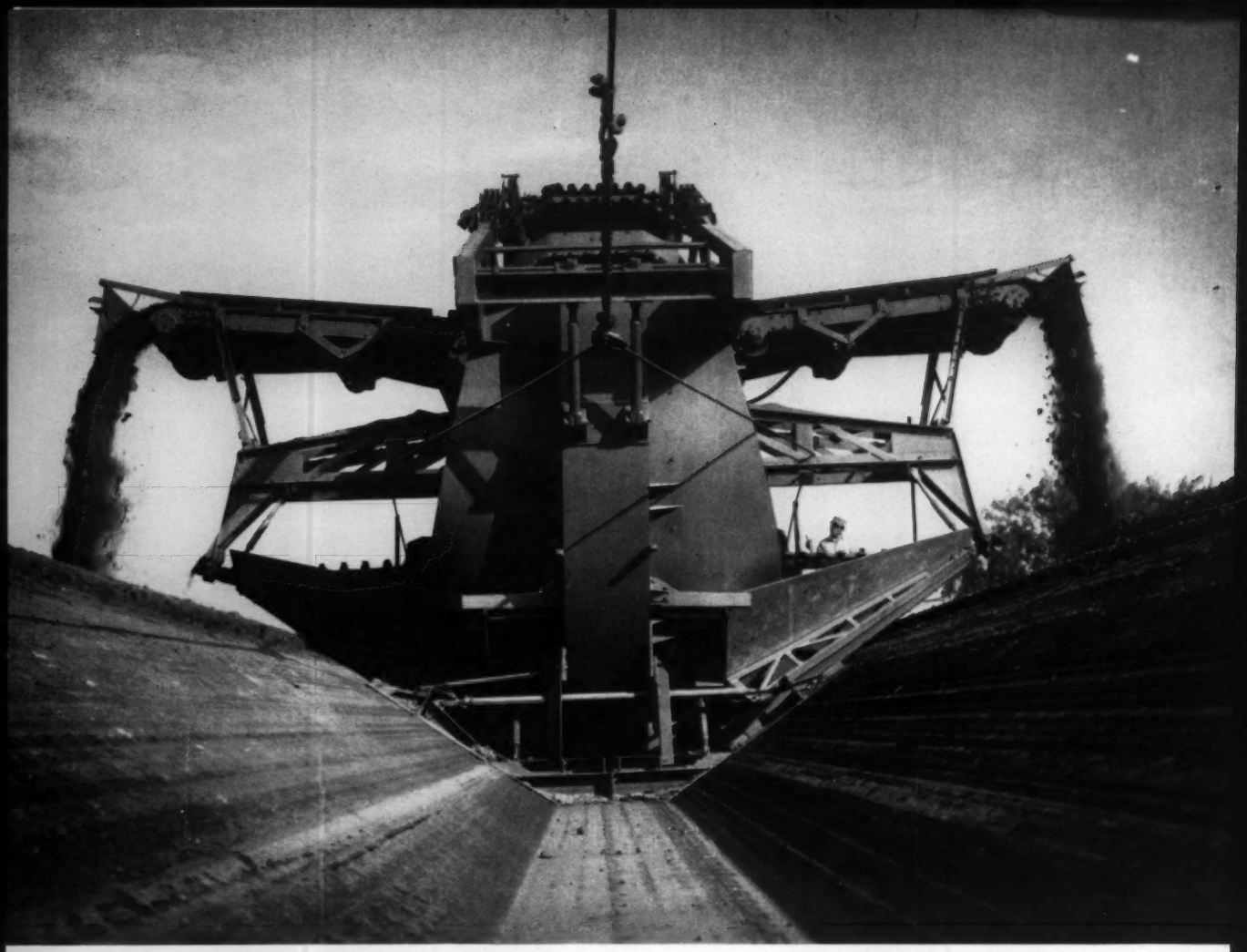


LUBRICATION IS A MAJOR FACTOR IN COST CONTROL



World's fastest ditcher...rugged proof of M&T Murex electrode welding quality

In one minute this monster machine carves out seven continuous feet of ditch 6′ deep, 4′ across, at the bottom, 22′ across at the top. Working at top capacity of 800 cubic yards of earth an hour, the ditcher could keep a large fleet of dump trucks mighty busy. Gar Wood Industries relied on M&T Murex electrodes to give the ditcher's all-welded frame the brute strength needed to do its Herculean job.

It's a vote of confidence in the quality of Murex electrodes and M&T service when one company after another singles them out for the important welding jobs. Super tanker . . . world's largest power shovels . . . welded buildings . . . award winning bridge—these are some of the many other outstanding jobs done with Murex electrodes—where their performance in the hands of the weldor and in the working product explains their fine reputation among engineers and production men everywhere.

This is one of the world's broadest, and most carefully manufactured, lines of electrodes. Over 1000 types and sizes . . . and serviced by men who know their business. Ask the M&T man for details or recommendations. Or send for literature on the Murex line of electrodes.

M&T **welding products** · plating products
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METAL & THERMIT CORPORATION, General Offices: Rahway, New Jersey

LILLIPUTIAN RADIO—"It is possible to make a radio the size of a match head," says Dr. A. M. Holladay, president, International Electronic Industries Div., Standard Pressed Steel Co., Philadelphia. "Two years ago, 10,000 miniature parts fitted a cubic foot of space; today, we are thinking in terms of 34 million," he says.

SLIPPERY ADDITIVES—By adding various inorganic sulfides (silver, antimony, titanium, for example) to either molybdenum or tungsten disulfide, General Electric Co., Schenectady, N. Y., obtained a solid lubricant which is said to have 20 times the bearing capacity of a normal lubricant. Studies have shown that surrounding air may have a significant effect on the lubricating efficiency of MoS_2.

CALL FOR CERAMIC ENGINEERS—"We need twice as many ceramic engineers and technologists to keep pace with defense demands," claims Dr. John H. Koenig, head, Department of Ceramics, Rutgers University, Philadelphia.

LIGHTER STRUCTURALS—Later this year, you should be able to obtain light, flat rolled sections of "T-1" steel heat treated to 100,000 psi, says U. S. Steel Corp., Pittsburgh. First trials of the new sections were made on advanced Army combat equipment demonstrated last month at Ft. Benning, Ga.

FUEL CELL GROWTH—Twelve material handling firms have jointly signed an agreement with Exide to develop and adapt fuel cells to industrial trucks, says Exide Industrial Div., Electric Storage Battery Co., Philadelphia. The device will convert gaseous fuels directly into electricity to power the vehicles.

SUPERFINISHING SOLUTION— A sticky problem on a liquid helium regulator for the X-15 was solved by superfinishing a poppet valve, reveals North American Aviation Inc., Los Angeles. It achieves 1 micro surface finish (rms) through controlled grinding a longitudinal lap and with stones that were split on a diagonal. A flour grade of compound was used throughout the final hand operation.

STUDY RE-ENTRY PROBLEMS—Down-to-earth hypersonic testing at Mach 25 will simulate the conditions met by space vehicles traveling 18,750 mph at 350,000 ft, says Convair Div., General Dynamics Corp., San Diego, Calif. It has just opened a new, $400,000 wind tunnel for that purpose. One object will be to learn how metals react in such an environment.

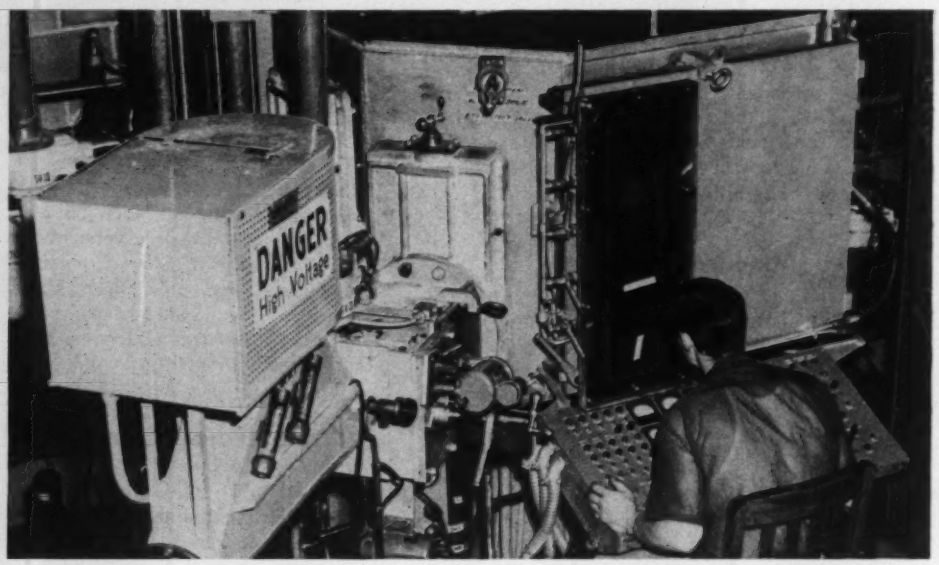
BEARING TECHNOLOGY—An Air Force sponsored study of hot bearings shows that M-2 tool steel and SAE 440-C stainless seem most satisfactory for temperatures up to 600° F, states Battelle Memorial Institute, Columbus, Ohio.

UPPING ALUMINUM'S STRENGTH—You can obtain up to 15 per cent more tensile strength, 25 per cent better elongation, plus improved machinability of aluminum-magnesium alloys by introducing carbon tetrachloride in a nitrogen carrier gas during melting, claims Aluminum Ltd., Montreal, Que. The treatment produces fine grained crystal structures.

NEW COLUMBIUM ALLOYS—Two new alloys containing titanium and zirconium (CB-65) or aluminum and vanadium (CB-22) have higher strength and oxidation resistance than pure columbium, states Union Carbide Metals Co., a division of Union Carbide Corp., New York. The alloys (they're for nuclear reactors) are said to have the same low neutron cross section as the pure metal.

EXPLOSIVE FORMING VISTAS—Engineers at Ryan Aeronautical Co., San Diego, Calif., are working out ways to explosively form superalloys and refractory metals while they are hot. Key to solution: Finding suitable media other than water for transmitting the explosive energy. One possibility: Fine glass beads.

Huge Unit to Check Economy Of Electron Beam Refining



250 kw furnace illustrates the porthole and control arrangement. First melts are run on raw stock that is inserted from the far right

A 1.5 million watt, $600,000 furnace under construction at Richmond, Calif., is expected to outperform competing refinement methods. Higher purities are also cited

A 1.5 MILLION WATT electron beam melting furnace now under construction may show that the process can be economical and competitive with either the consumable electrode or vacuum induction techniques.

The builder: Temescal Metallurgical Corp., Richmond, Calif. Its long term goal is a large scale furnace, perhaps 15 million watts, which could produce smooth faced diameter ingots up to 50 or 60 in. in diameter for as little as 20 cents a pound.

Temescal's president, Dr. Hugh B. Smith, emphasizes the ability of the electron beam to turn out superclean metals. "The main advantage," he says, "is that you can cast dense, crackfree ingots that are homogeneous throughout and that have significantly lower impurity levels."

Here are some additional benefits he attributes to the exotic method:

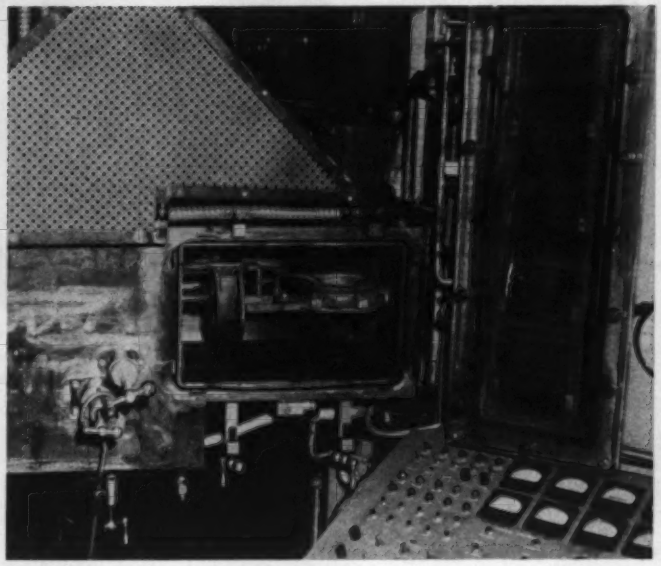
- Notch tensile properties of Vascojet 1000 are noticeably improved by electron beam melting.
- SAE 4340 welding wire melted with this technique is much easier to control in a welding machine and has less than 90 ppm total sulfur and phosphorous content.
- In electron beam refined iron base alloys, transverse and longitudinal properties are equal.
- When joining electron beam refined metals with an electron beam weld, the heat affected zone is no longer a serious strength factor.
- Piercing billets for seamless tubing have practically no pipes or slag inclusions when made from electron beam refined metal.

- **Operation starts with metal powder, sponge, sintered bars, or ingots. The furnace can even handle pressed machine turnings and press trimmings for the first melt.**

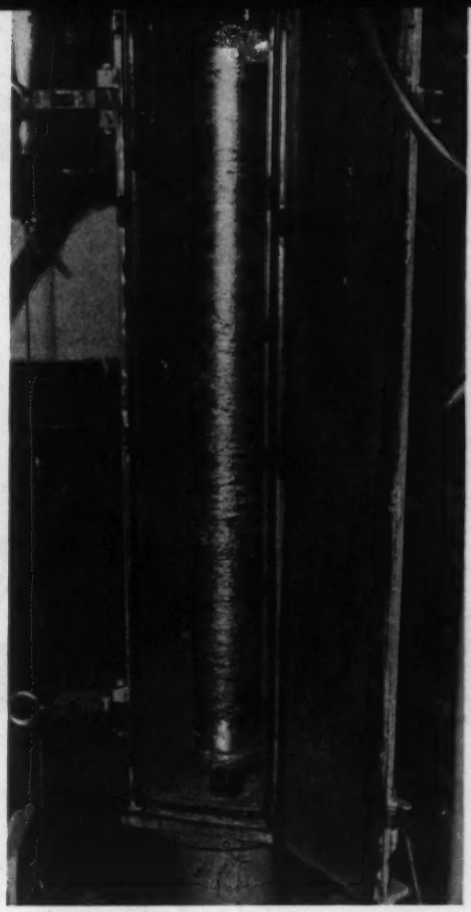
Furnaces are simple vacuum vessels or chambers fitted with air locks and handling equipment to permit continuous entry, cooling, and withdrawal of materials. Electron beam guns, a 15,000 volt power supply, and vacuum pumping equipment complete the picture.

The most significant parts of the process metallurgically are the initial melting and dripping of the feed stock and the time spent in the molten pool. Low pressure, high temperature, and the lack of contaminating materials provide the elements needed for purification.

Surface oxides atop refined ingot are a good indicator of the type and shape of the crystal structure throughout. It is typical of most electron beam melts



This is the airlock that permits the operator to change the electron gun. The shape of the gun must be varied to suit the metal being melted



As the metal solidifies, it is extracted from the mold, then dropped to this ingot removal lock

First melts of expensive metals are often roughly joined pieces of scrap which are pushed under the electron beam from one side. Molten metal drips into a water cooled, open bottom mold much like those used for continuous casting. Solidified ingots are removed and remelted a second or third time, depending on the degree of purity required.

Violent outgassing and splattering often occur during the first melting. Resulting erratic variations in power input do not interfere with the maintenance of a fully molten pool in the mold because of the rapid response of the control circuitry in the power supply.

• The refining technique is based on the comparative boiling and vaporization points of impurities vs. those of the pure metal and desired alloy additions.

The shape of the electron guns used must vary to suit the metal being melted, says Dr. Smith. Evaporation rates of metals vary widely, a phenomenon which makes refinement possible. For example, chromium melts at 3434° F, zirconium at 3326° F. But the vaporization rates are quite different. Chromium evaporates at about 0.57 gram per square centimeter per second while zirconium's rate is around 0.00000006 (roughly about 1 one-hundred-thousandth of 1 per cent that of chromium).

During a period of several hours, vaporized metal tends to collect on guns, but air locks and quick disconnects permit rapid replacement.

Temescal can predict the probable composition of an alloy it processes. Vapor pressure of the metal is figured and corrected, taking into account ideal solution theory and intermetallic bonding energy. If the resulting estimated vapor pressure is less than 10^{-5} atmospheres (or less than that of the base metal), no loss of that constituent will occur.

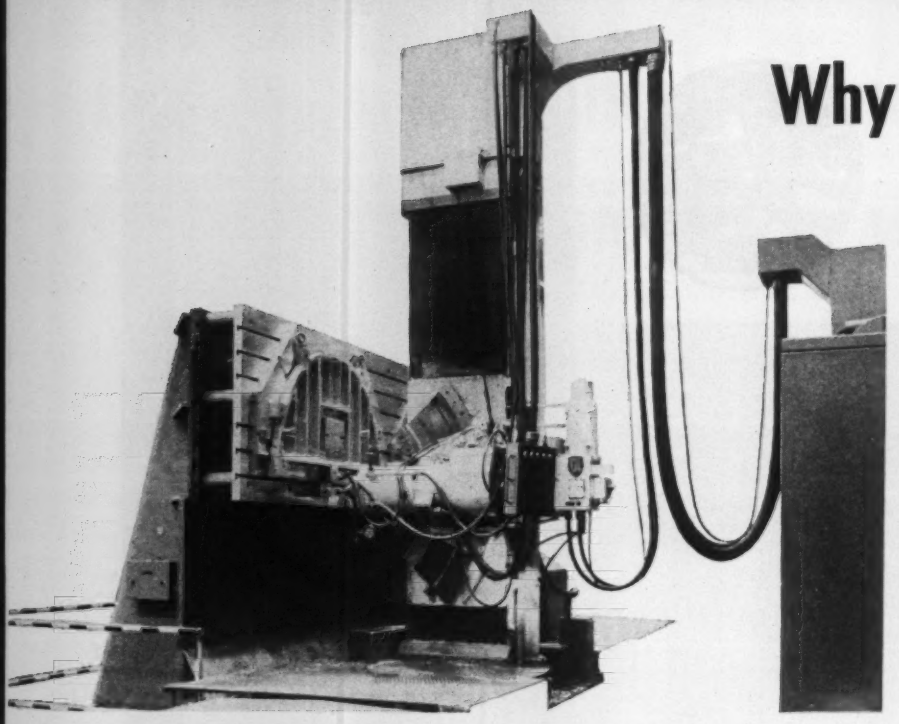
Another interesting chemical development has been the volatilizing of metallic suboxides, or the deoxidizing of metals and alloys in an electron beam. Work is in progress at Temescal, for Stauffer-Temescal, to produce ultrapure molybdenum which is completely free of grain boundary precipitates. The same work should produce other ultrapure refractory metals. Several tons of pure columbium, and their alloys, are being produced each month at the company's plant.

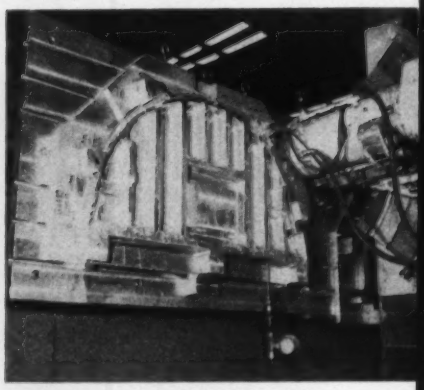
Electron beam furnaces can also superheat metals to produce experimental reactions said to be impossible with any other method.

Temescal expects its 1.5 million watt furnace to turn out 50,000 lb of columbium or 150,000 lb of ingot steel each month. The firm has also built many smaller furnaces for other refiners.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Why Tape Control





A five axis Variax machine finishes a complete bulkhead section with integral stiffeners. Material: Aluminum

As benefits keep piling up, this firm feels it has only started to realize dollar returns. Included are some intangible benefits it had overlooked

IN 1958, tool engineers at a large aircraft plant found that their machining facility could account for about 90 lb of aluminum chips for each 1000 direct labor hours.

In 1959, their continuous path, numerically controlled machine tools began to pay off. The figure increased to about 130 lb of chips for each 1000 direct labor hours.

Production management at the plant, Convair, a division of General Dynamics Corp., Ft. Worth, Tex., feels that further improvement is possible. They are 30 per cent more efficient in the use of the tape controlled machines than they were a year ago, and they expect to be 10 to 15 per cent more efficient a year from now.

• Experts feel Convair's experience suggests that some industrialists have been too quick to decide that numerically controlled contour machining is "just for the aircraft industry."

In what may be a proving ground for this type machining, here are some of the economic achievements:

Up to an 8 to 1 machining productivity increase on some aircraft parts; 4 to 1 tooling cost reduction on some jobs; a substantial reduction of paperwork; the conversion of some assemblies (with up to 100 detail parts) into a single machined part.

A further payoff for Convair is that it can afford to be extremely competitive in bidding for some missile and aircraft contracts. J. B. Rankin, staff co-ordinator for numerical control cites a 10 ft diameter bulkhead (see photos). He attributes much of the success of the contract to the broad utilization of numerical equipment.

He says: "A major goal is achieved when the benefits of numerical control machining are consistently reflected at the bid level, affording the contracts department a lever for obtaining more jobs on a competitive basis."

• About 165 parts have been programed.

With those parts, Mr. Rankin estimates that the numerical control machines are removing about 50 per cent of all metal machined in the production machine shop.

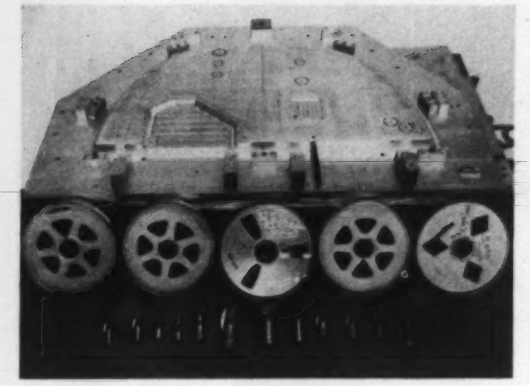
He says continuous path machining has been almost completely integrated in the production facilities. The first numerically controlled machine installed was a Giddings & Lewis, 96 in. wide skin mill which went into operation in February, 1958. It was followed by a second 96 in. machine in February, 1959, and a 144 in. wide machine is being installed. In addition, Convair also has a G&L five-axis Variax which was operational in September, 1958, and two, three axis, low speed Variax machines. One was operational in April, 1958, the other in October, 1958.

Completing the facilities, a G&L, Model B, high speed director was installed in July, 1959. It records the control signals on the magnetic tape used to guide the machine tools. Programing is done by ten programers.

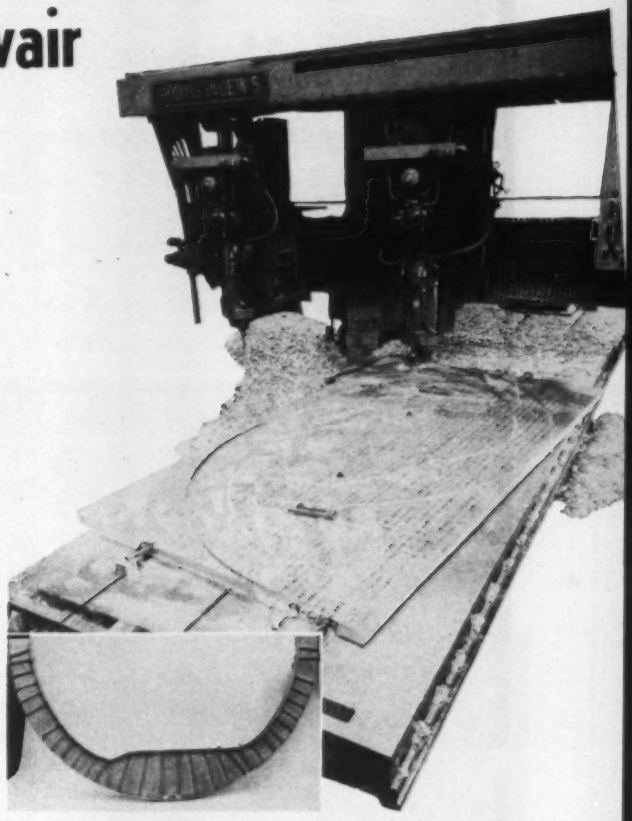
• Benefits can be large when assemblies are converted to machined parts.

As numerical control expanded,

Keeps Growing At Convair



This holding fixture, the tapes, and cutting tools represent the tooling investment needed to make a bulkhead like the one on opposite page

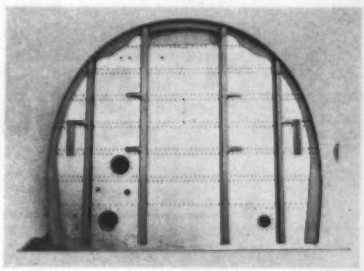


Rough cutout of a 10 ft wide bulkhead section on a skin mill brings numerical control efficiency to Convair's subcontract work. A single flute, 1 in. router takes a 2¾ in. cut at 18 ipm to rough out a piece every 45 minutes. The machine then finishes both sides in 15 hours (see inset), removing 442 lb of stock from a 510 lb blank. Hand finishing time has been eliminated

designers kept pace by slanting their techniques to take advantage of benefits. For example, fuselage bulkheads used to be made of sheet metal components riveted into a complete unit. Manufacturing required fixtures, assembly, and sealing. Now, an integrally stiffened bulkhead is made out of a solid piece. In some cases, 100 detail parts were eliminated.

A side benefit is the elimination of the paperwork. Another saving is attributed to the simplicity of the holding fixture needed for the complete bulkhead vs. the assembly. Still another is the elimination of sealing of rivets and parts to retain fuel. Chemical milling (required to lighten the bulkhead) is also no longer required.

The first opportunity for full use of numerical control came last year. Engineering, production, and programing sections worked together to incorporate as many numerically manufactured parts as possible in a newly designed fuselage section. Tooling was also turned out by the same method—with a substantial savings in that area too.



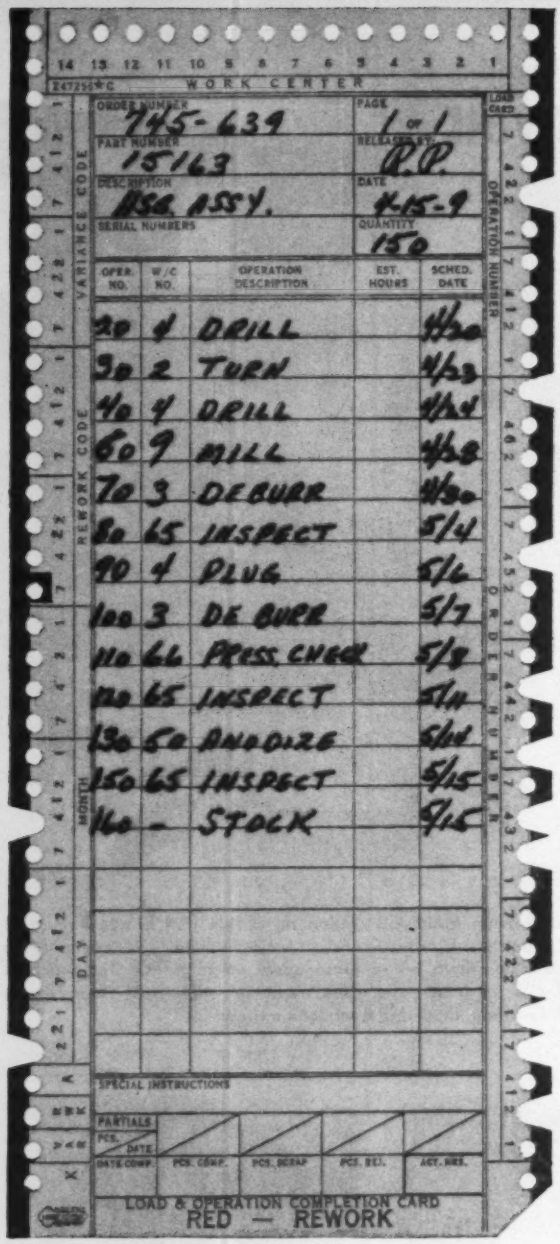
This shows how numerical control can influence some design concepts. The section at left was made from as many as 100 sheet metal parts, then fabricated into a single part. At right, bulkhead made from a solid piece of aluminum

• Enthusiasm for numerical control has been boosted by many intangible benefits, including substantial reductions in paperwork.

The maintenance record of the G&L control system itself has been quite good, says Convair. Less than 3 per cent of machine downtime can be attributed to control malfunction.

Paperwork reduction wasn't evaluated in the original proposal but has been a substantial factor in acceptance by Convair.

The reduction in templates and patterns has been as big as the best estimates. Smaller storage space and easier, faster engineering changes have also resulted from the introduction of numerical control.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LOAD & OPERATION COMPLETION CARD
RED — REWORK

1. Dispatcher prepares duplicating machine master for printing Keysort labor and progress control cards

Data Processing Helps Firm Keep Grip on Production Costs

A DATA PROCESSING SYSTEM produced a 30 per cent saving in clerical costs for Cadillac Gage Co., Costa Mesa, Calif., during a period when production increased 150 per cent.

The one system serves three functions: Production control, labor distribution, and accounts payable, says John Stone, controller for the West Coast Div. "Efficiency has been greatly improved. We are able to keep a tighter rein on our costs and can track down trouble areas much faster than was formerly possible."

In one area included in the overall system, only 30 per cent more help was needed to handle the 100 per cent production increase.

• Production control starts the operation by punching Keysort cards (Royal McBee) with job descriptions and data.

When an order arrives, it is routed through engineering, contract administration, and production control which posts the material requirements. Parts and materials which must be purchased are requisitioned.

The methods people next note on a master sheet the manufacturing operations for schedulers who list every department, process time, and completion dates. Keysort cards are printed, one for each manufacturing step. (They move through the shop with the parts to report

2. Following printing, tickets flow through these work center load racks. Top files hold backlog; center ones hold job cards which have been assigned to an operator. Lower files are for those in process

3. Machine operator punches and prints identification and time information on the labor card. It helps both production control and labor distribution in accounting

4. When cards arrive at accounting, clerk punches time standard with a tabulating punch which automatically notes time variations. Card totals are later compared with actual time spent on the job

progress.) Labor tickets are also prepared from the same master.

As material becomes available, the Keysort load card is assigned to an operator who does the work and notes the hours spent on the labor ticket. He also sends a Keysort "move ticket" back to production control which checks job scheduling. A tabulating punch machine automatically adds dates, labor data, and time variations and their appropriate explanations.

• The cards also permit easier determination of labor costs and the total time spent on each job as well as the workman involved.

Labor tickets for each job are sorted by clock number, and they are compared with the attendance cards.

Time variations are processed to produce a departmental labor summary which gives management a concise idea of how work time is running both by the hour and dollar value compared with work standards.

• Keysort card data also simplify accounts payable.

Cadillac's old system used to require two full-time clerks to handle individual posting. One clerk and the new system are now adequate even though production is greater.

The firm makes a variety of electrohydraulic servovalve assemblies for the West Coast aircraft and missile industries.

Grindermaker Eyes Stock Removal Jobs

He feels the grinding machine has begun to take over some machining jobs that have been reserved for other cutting operations. One application: The hard alloys

EXPERTS feel that precision grinding is showing real potential as a full-fledged member of the stock removal team. Significance: Many people think of the process solely in terms of generating extremely close tolerances and fine finishes.

If their reasoning is right, you may soon be using the grinding wheel for some of the machining jobs you have always run on other types of machine tools.

• **Multiple Causes**—At a 75th anniversary celebration for his company, Walter G. Johnson, manager of research and engineering, Machine Tool Div., Norton Co., Worcester, Mass., told STEEL that grinding has already replaced some of the other machining operations in the manufacture of camshafts and crankshafts.

Another area in which he sees good potential: Machining hard materials like those now being specified for rod mills. In such cases, where it's extremely difficult to turn the contours, production men are turning to grinding. (STEEL, Apr. 13, 1959, p. 122.)

Some aircraft and missile makers are considering grinding as one of the best ways out of the economy-property dilemma posed by the high property alloys. Most of the metals are hard enough to break down a cutting tool, but they can be ground with fair speed and economical wheel life.

In some cases, grinding may be the only machining operation needed to complete a part. Mr. Johnson points out that the more industry controls the shape of a raw material, reducing the amount of stock that has to be peeled off, the more prominent grinding will become.

• **Other Grinding Trends**—Looking toward The Machine Tool Exposition—1960, and beyond, Mr. Johnson picks at least three major trends that will affect the grinding machine user.

First, in-process gaging is becoming more attractive to customers. It is an assist to quality control and is relatively simple to put into a machine. "And with tolerances getting down to the millionths of an inch, you are forced into in-process gaging," says Mr. Johnson.

Second, he feels there is a trend toward standardization and complete interchangeability of parts among all manufacturers.

The third trend picked by Mr. Johnson is toward fuller utilization of a machine's cycle time. He says the continuing challenge is to develop fully automated units which can get up to 42 productive seconds out of each minute of operation.

• **At the Exposition**—Mr. Johnson revealed that Norton plans to exhibit 19 machines at Chicago in September. Of those, 15 will be grinding or lapping machines; four will be gear making machines resulting from the Gould & Eberhardt acquisition. Five of the products will have new features; 14 will be completely new designs.

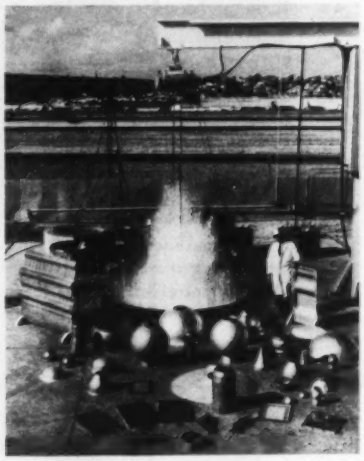
Commenting on the export potential for Norton's machine tools, Mr. Johnson said: "Overseas sales continue to be a prominent part of our business, but they are susceptible to changing conditions. Only specialized machines are being purchased. The foreign market for standard cylindrical and toolroom machines is being satisfied by overseas producers at overseas costs. It is unwise to have any feeling that we have a monopoly on knowhow and ability to make even the special machines. It is only a matter of time when the special machine market may also be lost to us."

Concentricity Assured

Automation engineers have solved the problem of getting concentricity in bearing seats, mounting flanges, and counterbores of rear axle tractor housings that weigh up to 175 lb.

A transfer machine, designed and built by the Cross Co., Detroit, does the job by rough machining all surfaces in one station and doing the finish boring and facing operations on both ends of the housings in another station, thus maintaining close alignment.

Maximum output required is 28 parts an hour. The machine can be used to turn out four different housings.



SUCCESS OF THIS EXPLOSIVE FORMING SETUP has led to construction of a production facility which will employ 75 people when completed, reveals Ryan Aeronautical Co., San Diego, Calif. Parts shown are typical of those handled by Ryan. The Army Arsenal at Watertown, Mass., has just awarded Ryan a contract for additional work in aluminum, titanium, stainless, and other steel alloys. In photo, Lloyd Paynter, manufacturing research engineer, demonstrates comparative safety of the process.

Tulip bed for stainless...

In our Viaduct Plant shear bay this "tulip bed for stainless" is important to you. It is this ball-bearing bed that helps our shearmen position plate easily, quickly, efficiently. But there's more than speed shown here. Carlson engineers modified this modern shear to provide unusually accurate cutting of stainless plate to your specifications.

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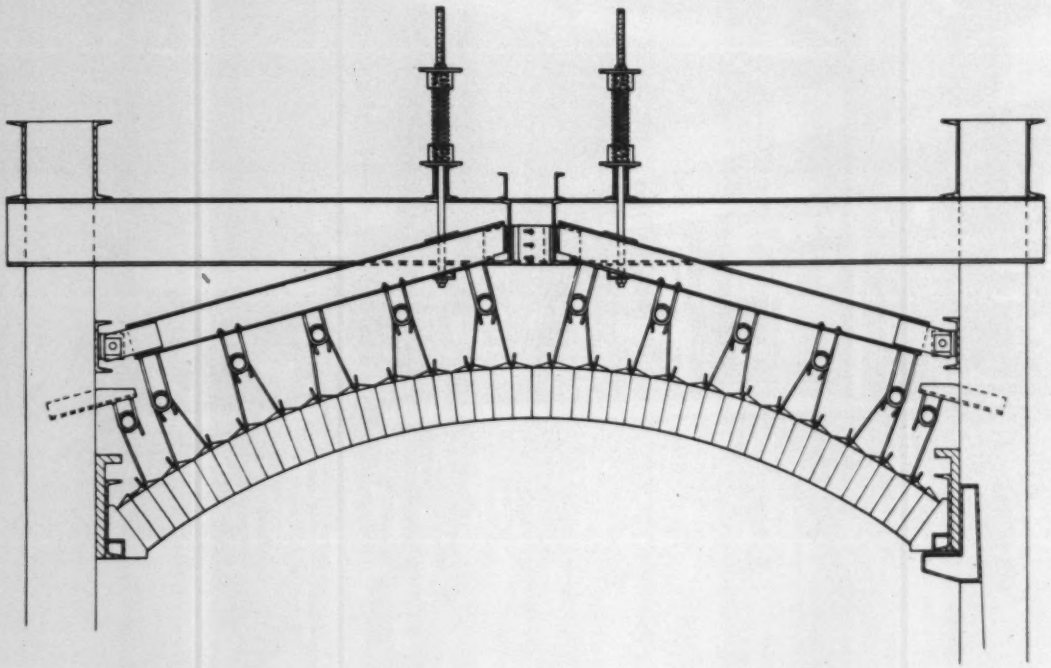


Pivoted beams anchored to the front wall and back wall buckstays allow the roof to move up or down, compensating for temperature changes in the furnace

Spring Suspension Cuts Roof Brick Wear

Use of magnesite chrome refractories and a supporting structure that eases arch pressure permitted this open hearth to turn in a campaign of 306 heats

A DESIGN that permits free rise and fall of an open hearth roof to accommodate varying temperatures is extending furnace campaigns at a Western Pennsylvania steel plant.

Roof refractories are hung from a steel framework that is supported by a coil spring system. The roof was installed by Geo. P. Reintjes Co., Kansas City, Mo.

• The roof is designed to function as a conventional sprung arch.

The lifting mechanism is designed to eliminate excessive pressure in the arch structure which, if uncontrolled, could cause deformity of the roof contour.

Pivoted beams, anchored at the front wall and back wall buckstays, are connected above the center, or crown of the roof, by overlapping plates with slotted holes. The beams can rise or fall as a unit but not individually.

Coil springs, supported by channels on the original furnace binders, are connected to the floating beams with threaded rods. Pipes 3 in. in diameter are suspended from the beams with U-bolts. Prebent rods are hooked over the pipes to support metal encased roof bricks.

• Much of the roof weight is supported by the springs at operating temperature.

The coil springs were designed

FIVE-DEEP

Millions have been made and saved

with UCM's "FIVE-DEEP" Ferroalloys

Metal producers in their ceaseless drive to improve products and profits are learning the value of Union Carbide Metals' FIVE-DEEP ferroalloys. Here are some of the advantages these alloys provide.

Five Extra Values in Depth

1. **Technology**—many million dollars a year, invested in UCM's 600-man research and development center—helps you produce more profitable metals. The payoff has been progress—over 100 new alloys and metals—providing countless ways to improve your products.
2. **Customer Service** brings you our integrated experience in the application of ferroalloys to various melting practices. Engineers from 9 UCM field offices travel a million miles a year to provide on-the-scene technical assistance.
3. **Global Ore Sources** assure you uninterrupted supplies of ferroalloys. UCM's close association with many mines throughout the world provides dependable raw material sources.
4. **Unmatched Facilities** free you from delivery worries. Only UCM gives you 6 plants—3 with their own power facilities—and 17 warehouses, all located for fast shipments by rail, truck, or water.
5. **Strictest Quality Control**—with over 100,000 tests per month from mines to shipment—makes sure you always get alloys of uniform size and analysis, with minimum fines, lot after lot.

For better metals, production economies, bigger profits, insist on UCM's FIVE-DEEP alloys. Union Carbide Metals Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y., producer of "Electromet" brand metallurgical products.

"Union Carbide" and "Electromet" are registered trade marks of Union Carbide Corporation.

UNION CARBIDE METALS

Only **ELECTROMET** ferroalloys from **UCM** are so deep in extra values to help you.

and adjusted to carry 40 per cent of the center two-thirds of the roof, as well as the floating beams, pipes, and rods. That amount of lift was expected to decrease pressure in the arch at the skew line to about 25 per cent of the pressure in a conventional sprung roof.

The ratio between expected refractory growth (rise in the roof) and weight loss from erosion and wear was calculated. That ratio was considered in choosing the springs. Theoretically, adjustment wouldn't be necessary during the life of the roof. As the roof continued to rise, it was expected to lose weight; springs would extend themselves and continue to give the right amount of lift in relation to weight.

• Refractories were similar to those used on Russian basic roofs.

Burned, magnesite chrome, metal encased bricks were used. The mix: About 70 per cent magnesite. The composition is said to be relatively new; little service information is available, but favorable reports on the mix have come from Russia.

The main roof was made of 12 by 4½ by 3 in. bricks; 13½ by 4½ by 3 in. bricks were used on the slopes. The metal casing of the bricks extends 1½ in. above the large end. Two holes are punched in the extended portion (on the 3 in. side) to accept suspension rods.

• Spring tension was adjusted during the campaign to compensate for uneven rise of the refractories.

The roof was cleaned once a week with compressed air. Measurements were taken regularly to plot roof movement.

Some spalling occurred during the 147 heats made before the 1959 steel strike. At about 100 heats, the roof began to rise near the oxygen lance openings, in a dome pattern. The area between the openings was also rising.

Roof rise in local areas caused some support rods to part from the pipes 1 to 3 in.; a crack appeared between the lance holes. Springs supporting the outer portion of the roof were tightened to raise the low spots and permit the domes to return to normal contour. Longitudinal members of the supporting structure were also modified to make them more flexible. Most of the high areas receded, and the separation between the lance openings closed slightly. But the domes around the openings continued to grow.

• The roof required no patching when the furnace was put into operation after the strike.

Careful inspection of the roof revealed that bricks were 9 to 10 in. thick at most points. They were slightly thinner around the lance openings. Springs were tightened again to compensate for loss of contour. Areas around the lance openings continued to rise slowly, until about 210 heats had been melted. Then the refractory material seemed to stabilize—rate of rise decreased noticeably.

• Worn out end walls made a furnace rebuild necessary; the roof would have been good for a longer campaign.

The furnace turned in a campaign of 306 heats, with no lost time for roof repairs. After inspection, it was decided to rebuild completely. The roof was 6 to 8 in. thick, but operating personnel elected to replace it because of its distortion. A new roof of the same design and material was installed, to take advantage of experience gained with the first.

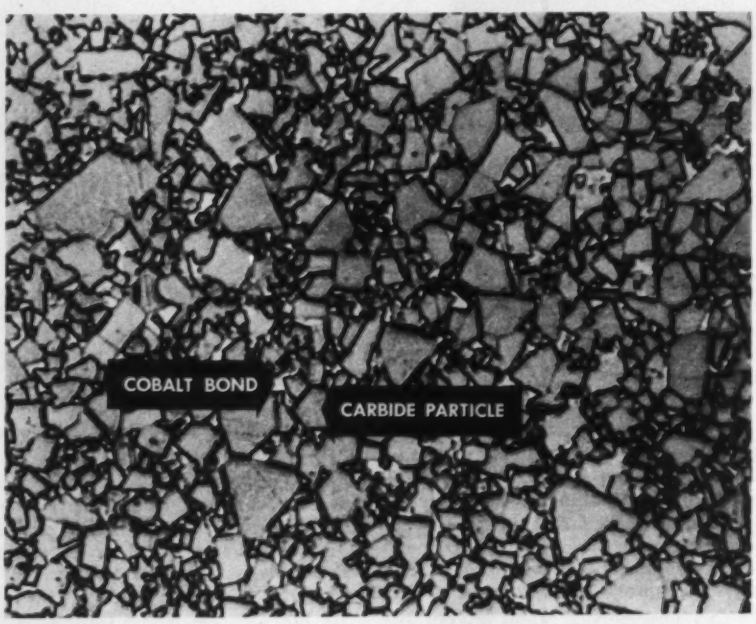
The original supporting structure was used for the new roof.

Piler Speeds Delivery Of Plates, Structurals

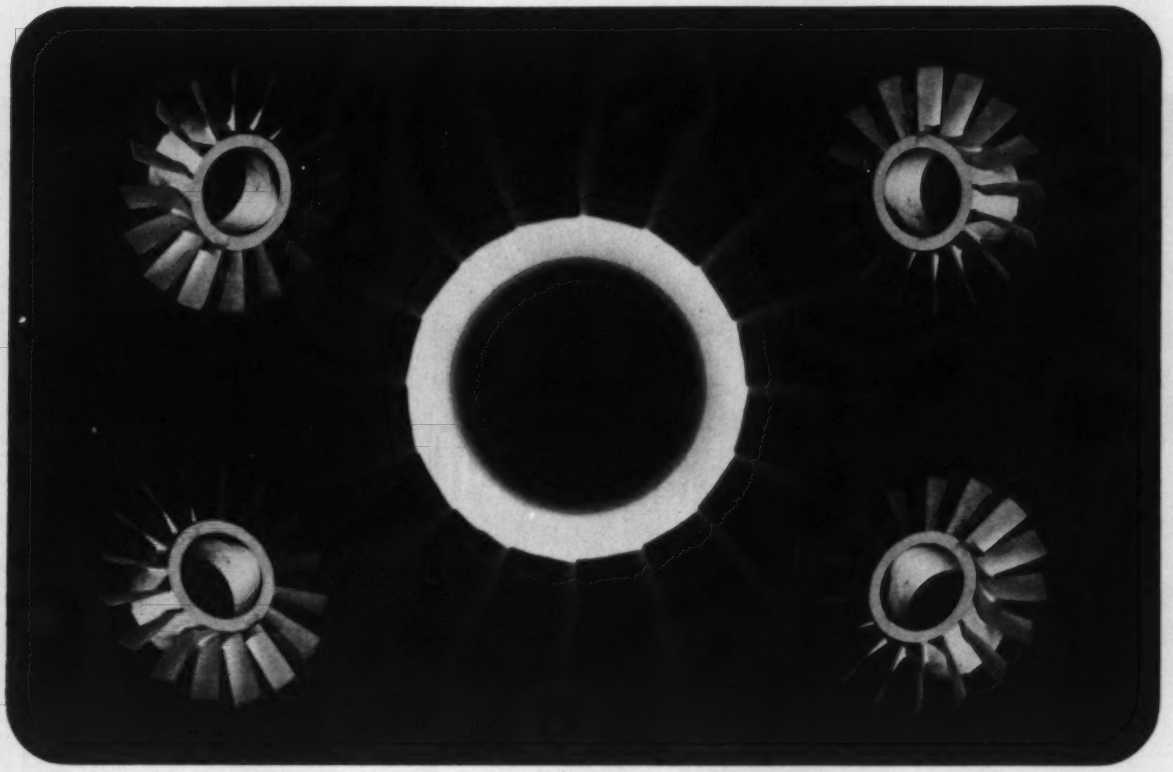
A magnetic piler and crane at Northwestern Steel & Wire Co., Sterling, Ill., is said to be the best yet for handling steel angles, channels, beams, and plates. Supplied by Birdsboro Corp., Birdsboro, Pa., it includes facilities to nest structural products and pile plates leaving the company's 20 in. rolling mill.

The unit includes a magnetic piler and a piling crane with an 84 ft span. Piler and crane are electrically interlocked. The equipment is remotely controlled by pushbuttons, but it is designed for fully automatic operation.

The piling system makes a neater package possible. It also permits faster delivery service, and piles up to one-third more steel in a given space. It allows the company to make up lifts of almost any weight.



PHOTOMICROGRAPH of cemented carbide used in balls for ball-point pens. Here's a cross section, at 175 X magnification, of a ball made from General Electric's Carboloy. Hardness and uniformity are needed for proper writing, long service



Pinwheels for an Inferno

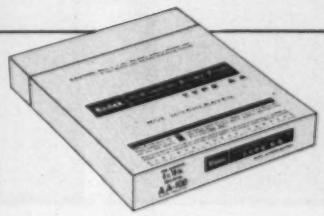
Turbine wheels in today's jet engines face intense heat and ultra-precise operating requirements. Austenal's Microcast Division checks them for soundness with radiography using Kodak Industrial X-ray Film, Type AA

Whirling at fantastic speeds at white heat is no sissy job. It takes castings molded to utmost accuracy to stand up dependably in a powerful jet.

Austenal Company, Microcast Products, casts such intricate parts as these by the "lost wax" method—and to check, lest any flaw lies hidden within, the castings are radiographed on Kodak Industrial X-ray Film, Type AA.

This is the way to be sure only high-quality work reaches the customer. It is a way good reputations are built and new business won.

Wouldn't you like to know how radiography can work for you? Talk it over with an x-ray dealer or write us for a Kodak Technical Representative to call.



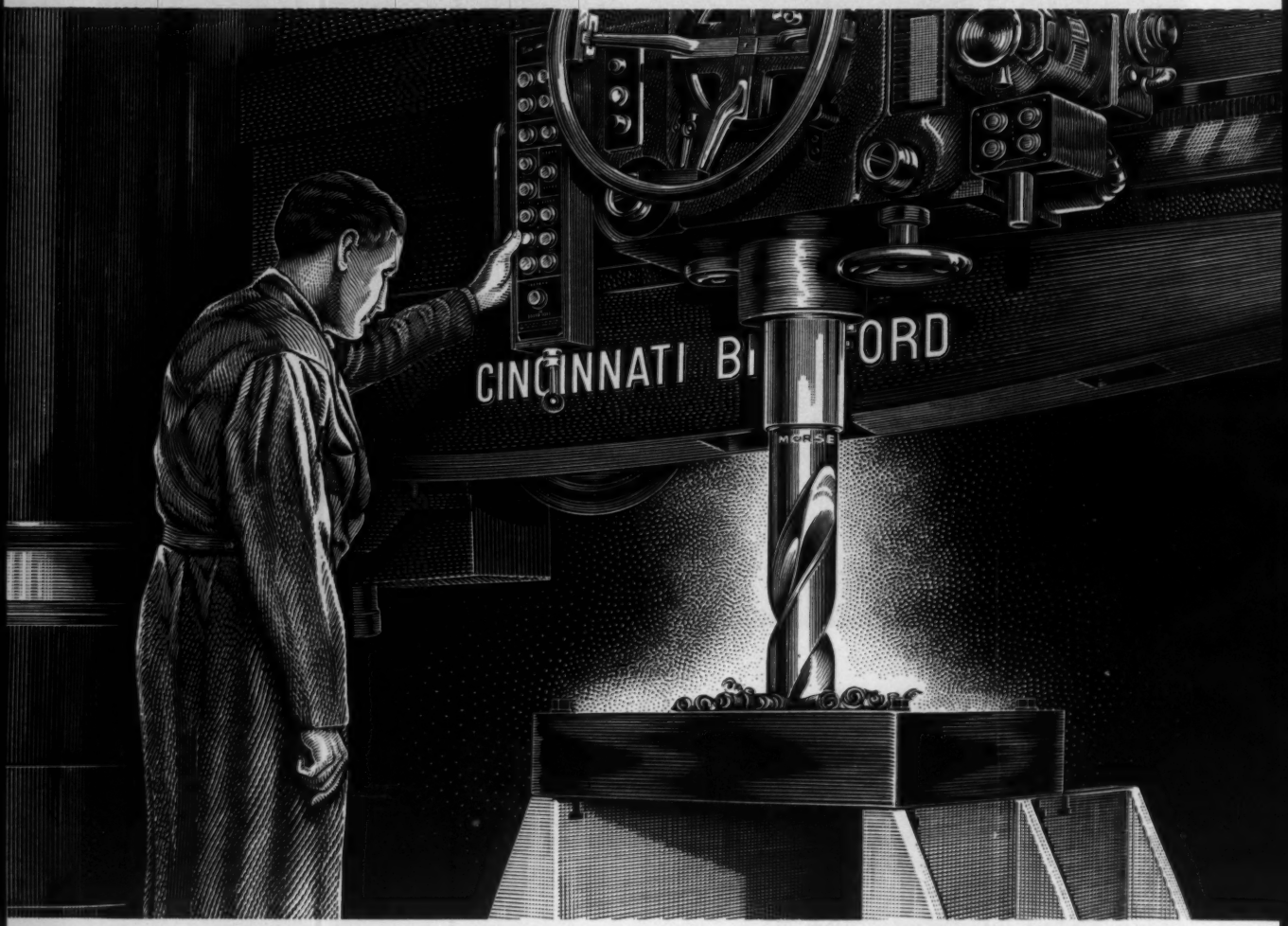
Read what Kodak Industrial X-ray Film, Type AA, does for you:

- Speeds up radiographic examinations.
- Gives increased detail visibility and easy readability at all energy ranges because of high film contrast.
- Provides excellent uniformity.
- Reduces the possibility of pressure desensitization under shop conditions.

EASTMAN KODAK COMPANY
X-ray Division Rochester 4, N. Y.

Kodak
TRADE MARK

MORSE...CINCINNATI BICKFORD GIVE A SHOW OF STRENGTH



Morse tough tools easily take the thrust of world's most powerful radial drill... utilizes its full power.

Cincinnati Bickford caused many a drill manufacturer to throw up his hands when they looked for a drill tough enough to stand up under the thrust of the most powerful radial drill ever built. They found what they wanted at Morse... a regular taper shank drill right off the shelf.

Let Morse provide the easy solution for your tough jobs. Your Morse-Franchised Distributor will give you full details. Call him today.

Morse means more production... smoother, more accurate production... with every type of cutting tool from drills, reamers, taps and dies, to end mills, milling cutters, slitting saws and "specials". So, if you want the best from every cutting tool you buy, mark your order "MORSE". For if you want *Morse Quality*, there's only one way to get it... *specify Morse.*

MORSE

means "THE MOST" *in Cutting Tools*

MORSE TWIST DRILL & MACHINE CO., NEW BEDFORD, MASSACHUSETTS

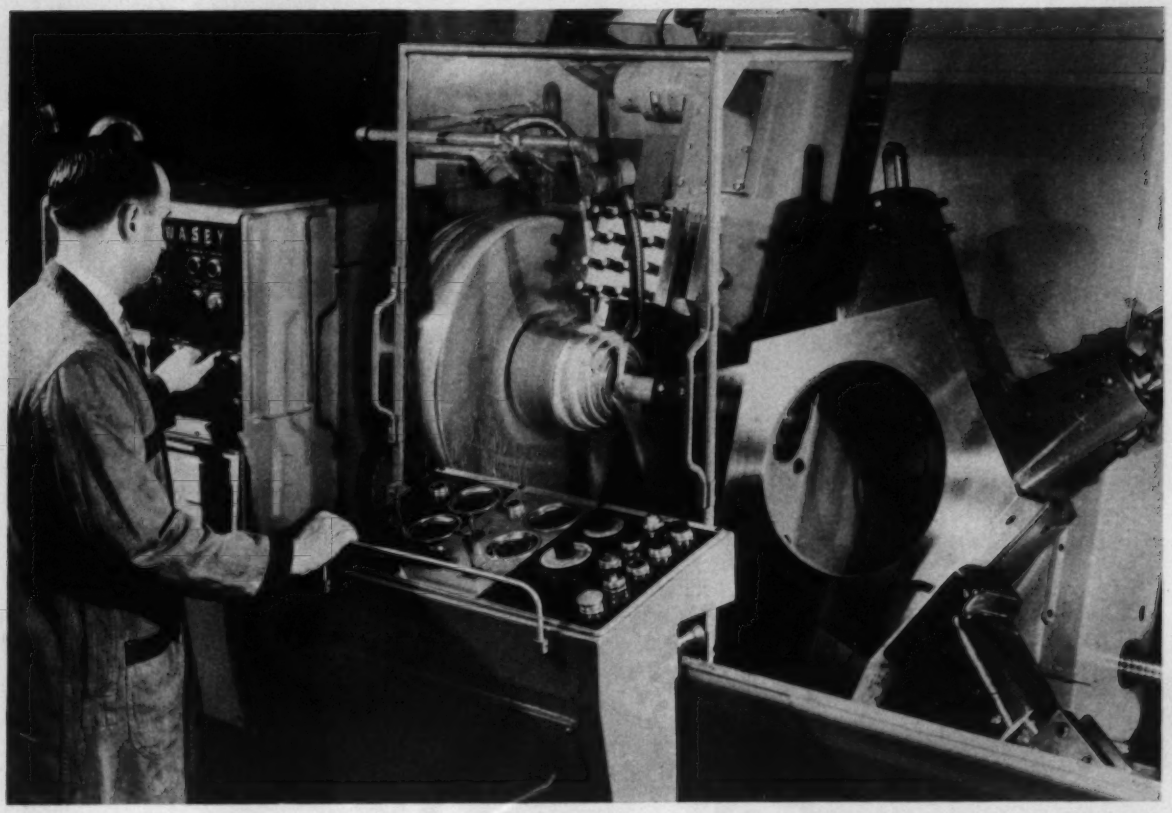
Warehouses in: NEW YORK • CHICAGO • DETROIT • DALLAS • SAN FRANCISCO

VN

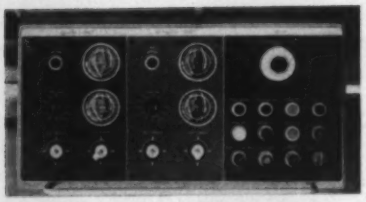
A Division of VAN NORMAN INDUSTRIES, INC.

2375

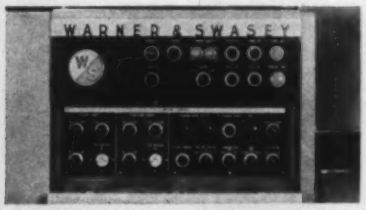
Builder Unveils Product Strides



Servofeed turret lathe has bed, ways, cross slide, and turret on a slant. Powered by a 60-30 hp, two speed motor, the machine gets all its cycle commands from a memory system—there are no handwheels or micrometer dials. Tool slides are driven through ball lead screws



This operator's control console is mounted on a front rail; it can be moved along the machine to any desired location



From this headstock control, the operator puts setup information into the machine's memory system

Four additions to the machine tool line, plus a new research center that will turn out more, spotlight this company's drive for new machine technology

MANAGERS at Warner & Swasey Co., Cleveland, showed last week that they intend to set a fast competitive pace in the drive for more productive machines.

• Intentions are backed with dollars.

The company unveiled its newly built 40,000 sq ft research center at Solon, Ohio. Walter K. Bailey, president, says the center brings together, so far as is practical, all research and development activities and personnel of the company.

Separate departments within the center include machine design, systems design, electronic controls, servo development, instruments, metal cutting, and metallurgical laboratories, and research engineering.

In addition, the facility has a prototype shop capable of fabricating full scale working models of new product designs. The center will

DOW
SOLVENTS

ANNOUNCING...

Chlorothene NU

New stabilizer system solves corrosion problems—makes recovery easy!

Newly developed Chlorothene® NU combines high solvency and safety with an advanced stabilizer system that makes possible an extraordinary range of cold-cleaning applications – makes recovery easy, too!

The exceptional stability of Chlorothene NU (specially inhibited 1,1,1-trichloroethane) practically eliminates corrosion of sensitive metals. You can use it for cleaning aluminum, zinc, and white-metal alloys—as well as other metals, many plastics, rubber products and other materials.

Because increased stability makes recovery easy and practical, you can enjoy the economy of using Chlorothene NU over and over again. In most cases, existing equipment, such as a trichloroethylene still, does an excellent job.

Safe two ways! Low in toxicity, Chlorothene NU has a maximum allowable vapor concentration of 500 parts per million. That's closely comparable to many flammable solvents and is substantially more favorable than most chlorinated solvents. In addition, Chlorothene NU has no fire or flash point, as measured by standard methods. These features not only make Chlorothene NU safer to use–they simplify new cleaning systems and waste disposal.

COLOR CODED –For easy identification, even from 100 feet away, drums of Chlorothene NU are distinctively color-coded in green and white. For more information about Chlorothene NU, call your distributor of Dow solvents. He knows all about its use, recovery and comparative cost. Or contact your nearest Dow sales office.

THE RIGHT SOLVENT FOR THOUSANDS OF INDUSTRIAL USES. Not only is Chlorothene NU recommended for cold-cleaning dip operations on the production line—it also cleans by spray, bucket or wipe methods. It's an all-purpose solvent for many applications, both on the production line and for maintenance use.

SEE YOUR DISTRIBUTOR OF DOW SOLVENTS FIRST!

The widest line of industrial solvents: Trichloroethylene, Perchloroethylene, Methylene Chloride, Chlorothene NU.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN DOW

FOR HELPFUL METAL CLEANING INFORMATION

get in touch with your Dow Solvents Distributor

DOW

LETTER KEYS: (C)—Chlorothene® NU; **(M)**—Methylene Chloride; **(P)**—Perchloroethylene (Industrial); **(T)**—Trichloroethylene

ALABAMA
BIRMINGHAM—Wittichen Chemical Company **(C M P)**
BIRMINGHAM—F. H. Ross & Company, Inc. **(C M P)**
MOBILE—McKesson & Robbins, Inc. **(C M P T)**
MOBILE—F. H. Ross & Company, Inc. **(C M)**
MONTGOMERY—Wittichen Chemical Company **(C M P)**

ARIZONA
PHOENIX—Braun Chemical Company **(C M P T)**
PHOENIX—Western Chemical Company **(C M P)**
TUCSON—Western Chemical Company **(C M P)**

CALIFORNIA
LOS ANGELES—Braun Chemical Company **(C M P T)**
LOS ANGELES—McKesson, Mefford Chemical Division **(P)**
LOS ANGELES—Pemaco, Inc. **(P T)**
SAN DIEGO—Braun Chemical Company **(C M P T)**
SAN FRANCISCO—Braun-Knecht-Heimann Co. **(C M P T)**
SAN FRANCISCO—G. N. Meacham Company **(C)**

COLORADO
DENVER—Braun-Knecht-Heimann Company **(C M)**
DENVER—Chemical Sales Company **(C M P T)**
DENVER—McKesson & Robbins, Inc. **(C M P T)**
DENVER—Mine and Smelter Supply Company **(C M P T)**
GRAND JUNCTION—C. D. Smith Co., Chemical Div. **(C P T)**

CONNECTICUT
HARTFORD—Dwight R. Judson Company **(C T)**
NEW HAVEN—H. Krevit and Company, Inc. **(C P T)**
SHELTON—Axton-Cross Company **(C M P T)**
SOUTH NORWALK—Guard-All Chemical Co. **(C M P T)**
STAMFORD—McKesson & Robbins, Inc. **(C M P)**
WATERBURY—Hubbard Hall Chemical Company **(M)**

FLORIDA
JACKSONVILLE—F. H. Ross & Company, Inc. **(C M P)**
JACKSONVILLE—Amica Burnett Chemical Co. **(C M P T)**
MIAMI—Amica Burnett Chemical Co. **(C M P T)**
MIAMI—Biscayne Chemical Laboratories **(C M P)**
ORLANDO—Atlantic Chemicals, Inc. **(C M P T)**
TAMPA—Amica Burnett Chemical Co. **(C M P T)**
TAMPA—Atlantic Chemicals, Inc. **(C M P T)**
TAMPA—McKesson & Robbins, Inc. **(C M P T)**

GEORGIA
ATLANTA—Chapman Chemical Company **(T)**
ATLANTA—McKesson & Robbins, Inc. **(C M P T)**
ATLANTA—F. H. Ross & Company, Inc. **(C M P)**
ATLANTA—Southern States Chemical Co. **(C M P T)**
BIRMINGHAM—Chapman Chemical Company **(T)**
COLUMBUS—F. H. Ross & Company, Inc. **(C M P)**
DUBLIN—Textile Aniline Chemical Company **(T)**

IDAHO
BOISE—Van Waters & Rogers, Inc. **(C M P)**

ILLINOIS
AURORA—River Valley Chemicals, Inc. **(C M P T)**
CHICAGO—Central Solvents & Chemicals Co. **(C M P)**
CHICAGO—C. P. Hall Company of Illinois **(C M P T)**
CHICAGO—McKesson & Robbins, Inc. **(C M P T)**
CHICAGO—Joseph Turner & Company **(C M P T)**
DECATUR—McKesson & Robbins, Inc. **(C M P T)**
EFFINGHAM—Wabash Independent Oil Company **(C P T)**
MELROSE PARK—London Chemical Company, Inc. **(P T)**
PEORIA—McKesson & Robbins, Inc. **(C M P T)**
ROCKFORD—Industrial Oil & Chemical Company **(C)**
ROCKFORD—Viking Chemical Company **(C M P T)**

INDIANA
EVANSVILLE—Barning Industrial Chemicals, Inc. **(C M P T)**
EVANSVILLE—Charles Leich and Company **(P)**
FT. WAYNE—Hoosier Solvents & Chemicals Corp. **(C M P)**
FT. WAYNE—Inland Chemical Corporation **(C M P)**
HAMMOND—Inland Chemical Corporation **(C M P T)**
INDIANAPOLIS—Hoosier Solvents & Chemicals Corp. **(C M P)**
INDIANAPOLIS—Wm. Lynn Chemical Co., Inc. **(C M P)**
INDIANAPOLIS—Ulrich Chemical Company, Inc. **(C T)**
KOKOMO—Plating Products, Inc. **(T)**
LOGANSPORT—Plating Products, Inc. **(T)**
SOUTH BEND—Inland Chemical Corporation **(C M P T)**
SOUTH BEND—Stevens Company **(C M P)**

IOWA
BETTENDORF—Barton Naphtha Corporation **(C M P)**
BURLINGTON—McKesson & Robbins, Inc. **(C M P T)**
CEDAR RAPIDS—McKesson & Robbins, Inc. **(C M P T)**
COUNCIL BLUFFS—Barton Solvents Co. **(C M P T)**
DAVENPORT—McKesson & Robbins, Inc. **(C M P T)**
DES MOINES—Barton Naphtha Company **(C M P T)**
SUMNER—Overton Chemical Sales **(C)**

KANSAS
WICHITA—McKesson & Robbins, Inc. **(C M)**

KENTUCKY
LOUISVILLE—Dixie Solvents and Chemicals Co. **(C M P)**
LOUISVILLE—Gans Chemical and Supply Company **(P)**
LOUISVILLE—McKesson & Robbins, Inc. **(C M P T)**

LOUISIANA
BATON ROUGE—McKesson & Robbins, Inc. **(C)**
NEW ORLEANS—McKesson & Robbins, Inc. **(C)**
NEW ORLEANS—Southern Solvents and Chemicals **(C M P T)**

MAINE
LEWISTON—Polar Chemical Company **(C M P T)**

MARYLAND
BALTIMORE—Leidy Chemicals Corporation **(C M P)**
BALTIMORE—Seiler-Hughes Chemicals, Inc. **(C)**
BALTIMORE—Tilley Chemical Company **(T)**

MASSACHUSETTS
BOSTON—Howe and French, Inc. **(C M)**
BOSTON—Linder and Company, Inc. **(C M P T)**
BOSTON—McKesson & Robbins, Inc. **(C M P T)**
EVERETT—Sessions-Gifford Co., Inc. **(C M P T)**
FRAMINGHAM—Axton-Cross Corp. of Mass. **(C P T)**
HINGHAM—Stephen-Roger, Inc. **(C M P T)**
SPRINGFIELD—Chemical Corporation **(C M P T)**
SPRINGFIELD—Hampden Color & Chem. Co. **(C M P)**
STONEHAM—George Mann & Company, Inc. **(C M P T)**
WESTFIELD—Eastern Chemicals, Inc. **(M)**
WORCESTER—George H. Clark and Co. **(C M P T)**

MICHIGAN
DETROIT—Eaton Chemical & Dyestuff Company **(C M)**
DETROIT—Manpro Corporation **(C M P T)**
DETROIT—McKesson & Robbins, Inc. **(C M P T)**
DETROIT—Western Solvents & Chemicals Company **(C M P)**
DETROIT—Whitfield Chemical Company **(P)**
ESCANABA—Haviland Products Company **(C M P)**
FERNDALE—Manpro Corporation **(C M P T)**
GRAND RAPIDS—Haviland Products Company **(C M P)**
GRAND RAPIDS—McKesson & Robbins, Inc. **(C M P T)**
GRAND RAPIDS—Wolverine Solvents & Chemicals Co. **(C M P)**
LANSING—Carrier Stephens Company **(C M P)**
LANSING—Wheaton Chemical Company **(C P)**
SAGINAW—McKesson & Robbins, Inc. **(C M P T)**

MINNESOTA
MINNEAPOLIS—W. H. Barber Company **(P T)**
MINNEAPOLIS—McKesson & Robbins, Inc. **(C M P T)**
ST. PAUL—Lyons Chemicals, Inc. **(C M P)**

MISSISSIPPI
JACKSON—F. H. Ross & Company, Inc. **(C M P)**

MISSOURI
KANSAS CITY—McKesson & Robbins, Inc. **(C M)**
KANSAS CITY—Missouri Solvents and Chemicals Co. **(C M P)**
KANSAS CITY—Sherwood and Company, Inc. **(C M P T)**
ST. LOUIS—McKesson & Robbins, Inc. **(C M P T)**
ST. LOUIS—Independent Oil Company **(C M P T)**
ST. LOUIS—G. S. Robins and Company **(C M P)**
ST. LOUIS—Missouri Solvents and Chemicals Co. **(C M P)**

NEBRASKA
OMAHA—Barton Solvents Company **(C M P T)**
OMAHA—McKesson & Robbins, Inc. **(C M P T)**

NEW JERSEY
BLOOMFIELD—McKesson & Robbins, Inc. **(C M P)**
CAMDEN—Callahan Chemical Company **(C M P T)**
EAST PATERSON—Aetna Chemical Corp. **(C M P T)**
MURRAY HILL—American Mineral Spirits Co. **(C M P T)**
NEWARK—American Oil and Supply Co. **(C P)**
NEWARK—National Oil and Supply Company **(C M P T)**
PALISADES PARK—Philip A. Hunt Company **(C)**
PERTH AMBOY—Modern Solvents & Chemicals Corp. **(M P T)**
RIVERDALE—A. H. Mathieu Company **(P)**
SOUTH KEARNY—American Chemicals, Inc. **(C M P T)**
VINELAND—Lirio Chemical Company **(C P T)**

NEW MEXICO
ALBUQUERQUE—Braun Chemical Company **(C M P T)**
ALBUQUERQUE—Edmunds Chemical Company **(C M P T)**

NEW YORK
ALBANY—Krackler & Campbell, Inc. **(M)**
ATHENS—Spick Products Company **(P T)**
BINGHAMTON—Collier Chemicals, Inc. **(P T)**
BRONX—Elco Solvents Corporation **(M P T)**
BROOKLYN—Enequist Chemical Company **(C P)**
BUFFALO—Buffalo Solvents and Chemicals **(C M P)**
BUFFALO—Chemical Sales Corporation **(C M P T)**
BUFFALO—McKesson & Robbins, Inc. **(C M P T)**
GARDEN CITY—Hogan Industrial Supply Corp. **(C M P T)**
GLOVERSVILLE—Eastern Chemicals, Inc., S. H. Ireland Div. **(C M)**
KEARNY—American Chemicals, Inc. **(C M P T)**
LONG ISLAND CITY—Peerless Oil and Chemical Corp. **(C M P T)**
NEW YORK—American Chemicals, Inc. **(C M P T)**
NEW YORK—McKesson & Robbins, Inc. **(C M P)**
POUGHKEEPSIE—Duso Chemical Company **(C)**
RENSSELAER—Eastern Chemicals, Inc. **(C M)**
ROCHESTER—Chemical Sales Corporation **(C M P T)**
SYRACUSE—Eastern Chemicals, Inc. **(C M)**
UTICA—Monarch Laboratories **(C M P)**

NORTH CAROLINA
CHARLOTTE—F. H. Ross & Company, Inc. **(C M)**
CHARLOTTE—Moreland Chemical Company **(C M P T)**
CHARLOTTE—Southern States Chemical Co. **(C M P T)**
GREENSBORO—F. H. Ross & Company, Inc. **(C M)**

OHIO
AKRON—Farley Solvents Company **(C M P T)**
AKRON—C. P. Hall Company **(C M P T)**
CANTON—Bison Corporation **(C M P)**
CINCINNATI—Amsco Solvents and Chemicals Co. **(C M P)**
CINCINNATI—Chipman Supply Company **(T)**
CINCINNATI—Herbert Chemical Company **(P T)**
CINCINNATI—McKesson & Robbins, Inc. **(C M P T)**
CLEVELAND—Man-Gill Chemical Company **(C P T)**
CLEVELAND—McKesson & Robbins, Inc. **(C M P T)**
CLEVELAND—National Solvents Corporation **(C P T)**
CLEVELAND—Ohio Solvents and Chemicals, Inc. **(C M P)**
CLEVELAND—R. W. Renton Company **(C P T)**
COLUMBUS—McKesson & Robbins, Inc. **(C M P T)**
DAYTON—Industrial Chemical Products Co. **(C P T)**
DAYTON—Ottoson Solvents, Inc. **(T)**
LIMA—Thomson Chemical Company **(C M P T)**
TOLEDO—Inland Chemical Co. **(C M P)**
TOLEDO—Toledo Solvents and Chemicals **(C M P)**
TOLEDO—M. I. Wilcox Company **(C P T)**
YOUNGSTOWN—Rhiel Supply Company **(C M P T)**

OKLAHOMA
OKLAHOMA CITY—McKesson & Robbins, Inc. **(C M P T)**
TULSA—McKesson & Robbins, Inc. **(C M P T)**
TULSA—Chemical Products, Inc. **(C M P T)**

OREGON
PORTLAND—Van Waters & Rogers, Inc. **(C M P)**

PENNSYLVANIA
CONSHOHOCKEN—American Mineral Spirits Co. **(C M P T)**
EASTON—Lehigh Valley Chemical Company **(C M P T)**
ERIE—Monarch Laboratories **(T)**
LEESPORT—R. W. Eaken, Inc. **(C M P T)**
McKEES ROCKS—Apex Soap and Sanitary Corp. **(C P T)**
PHILADELPHIA—Alex C. Fergusson Company **(C P T)**
PHILADELPHIA—McKesson & Robbins, Inc. **(C M P T)**
PHILADELPHIA—Phillips and Jacobs, Inc. **(C M)**
PHILADELPHIA—Pioneer Salt Company **(C M P T)**
PHILADELPHIA—George Senn, Inc. **(C M P T)**
PITTSBURGH—Carmac Chemical Company, Inc. **(C P)**
PITTSBURGH—Carman-Pittsburgh Company, Inc. **(C)**
PITTSBURGH—Ft. Pitt Chemical Company **(C)**
PITTSBURGH—McKesson & Robbins, Inc. **(C M P T)**
READING—Textile Chemical Company **(C P)**
SCRANTON—Scranton Chemical Company **(C P T)**
YORK—Industrial Solvents and Chemicals Co. **(C P T)**

RHODE ISLAND
CRANSTON—Giffordline Chemical Company **(C M P T)**
PROVIDENCE—George Mann & Company, Inc. **(C M P T)**
PROVIDENCE—Sessions-Gifford Company, Inc. **(C M P T)**

SOUTH CAROLINA
CHARLESTON—Burris Chemical Company **(C P T)**
GREENVILLE—F. H. Ross & Company, Inc. **(C M)**
GREENVILLE—Southern States Chemical Co. **(C M P T)**
SPARTANBURG—Moreland Chemical Co., Inc. **(C M P T)**

TENNESSEE
CHATTANOOGA—Chapman Chemical Co. **(C M P T)**
CHATTANOOGA—Wilson Sales Company **(C M P T)**
KINGSPORT—Chem-I-Dent, Inc. **(C P T)**
MEMPHIS—Chapman Chemical Company **(C M P T)**
MEMPHIS—C. P. Hall Company **(C M P T)**
MEMPHIS—Ideal Chemical and Supply Co. **(C M P T)**
NASHVILLE—Chapman Chemical Company **(C M P T)**
NASHVILLE—Wilson Sales Company **(C M P T)**

TEXAS
AMARILLO—State Chemical Company **(C M P T)**
AUSTIN—R. M. Hughes Company, Inc. **(C M P T)**
BEAUMONT—Arthur Dooley and Son **(C M P T)**
CORPUS CHRISTI—McKesson & Robbins, Inc. **(C M P T)**
DALLAS—McKesson & Robbins, Inc. **(C M P T)**
DALLAS—Texas Solvents and Chemicals Co. **(C)**
DALLAS—Van Waters and Rogers, Inc. **(C M P T)**
EL PASO—Baron Chemical Company **(C M P T)**
EL PASO—Braun Chemical Company **(C M P T)**
EL PASO—Mine and Smelter Supply Company **(P)**
FORT WORTH—McKesson & Robbins, Inc. **(C M P T)**
HOUSTON—McKesson & Robbins, Inc. **(C M P T)**
HOUSTON—W. H. Curtin and Company **(P)**
HOUSTON—Dixie Chemical Company **(C M P T)**
HOUSTON—R. M. Hughes Company, Inc. **(C M P T)**
HOUSTON—Texas Solvents and Chemicals Co. **(C M P)**
HOUSTON—Van Waters and Rogers, Inc. **(C M P T)**
LUBBOCK—State Chemical Company **(C M P T)**
MIDLAND—State Chemical Company **(C M P T)**
ODESSA—McKesson & Robbins, Inc. **(C M P T)**
SAN ANTONIO—R. M. Hughes Company, Inc. **(C M P T)**
SAN ANTONIO—McKesson & Robbins, Inc. **(C M P T)**
TERMINAL—State Chemical Company **(C M P T)**

UTAH
SALT LAKE CITY—Braun-Knecht-Heimann Co. **(C M P T)**

VIRGINIA
RICHMOND—Phipps and Bird, Inc. **(C M P T)**
ROANOKE—Havnaer Supply Company **(C M P T)**

WASHINGTON
SEATTLE—Van Waters & Rogers, Inc. **(C M P)**
SPOKANE—Van Waters & Rogers, Inc. **(C M P)**

WEST VIRGINIA
BLUEFIELD—Fairmont Supply Co. **(T)**
CHARLESTON—B. Preiser Company, Inc. **(C M P T)**
FAIRMONT—Fairmont Supply Company **(C P T)**
HUNTINGTON—Cabell Chemical Company **(C P T)**

WISCONSIN
APPLETON—McKesson & Robbins, Inc. **(C M P T)**
CHIPPEWA FALLS—Lyon Chemicals Co., Inc. **(C M P)**
LA CROSSE—North Central Chemicals, Inc. **(C M P T)**
LA CROSSE—Wisconsin Solvents & Chemicals Corp. **(C M P)**
MADISON—North Central Chemicals, Inc. **(C M P T)**
MILWAUKEE—Benlo Industrial Chemicals Company **(P T)**
MILWAUKEE—McKesson & Robbins, Inc. **(C M P T)**
MILWAUKEE—Wisconsin Solvents & Chemicals Corp. **(C M P)**
WAUKESHA—F. P. Jay Chemicals, Inc. **(C M T)**

See Your Distributor of Dow Solvents First!

handle textile machinery and earth-moving equipment design and test work, as well as machine tool projects.

The company is focusing on equipment developments for tomorrow, but it also showed it has been investing to create some new technology now.

Example: A 25 in. swing, numerically controlled turret lathe stores commands in a memory system. The same shapes and tolerances on the first piece are duplicated in all parts in a lot. The machine's bed, ways, cross slide, saddle, and turret are inclined 20 degrees rearward from the vertical.

Called the Servofeed turret lathe, the machine has a memory system that can assimilate up to 96 consecutive commands, each handling machine functions such as change speed and start rapid traverse. Any command can be changed without disturbing others in the sequence.

• No tape or outside programing is necessary.

The operator simply pushes a button at the end of an acceptable cut during setup. That puts all pertinent factors into the machine's memory in the form of commands. The commands control the machine operation on the succeeding pieces in the lot.

An incremental tape path-control system can be added to the machine for contouring. At the specified point on the cycle, the memory unit automatically cuts in tape operation.

If an alteration needs to be made in the cycle, as when a cutter is adjusted or replaced, the operator runs the automatic cycle to the point where the new cutter comes in. He then stops the cycle, switches the machine to hand operations, and makes his adjustment. Pressing the record button puts the corrected command in the memory, and the machine can be returned to automatic. Corrections can be made in the memory system to 0.0005 in. in the horizontal and 0.00025 in. in the cross direction.

In addition to the new Servofeed turret lathe, W&S officials showed off: A #2 Micro-Cut turret lathe for precision work, a 4-A lathe with a servotape, two axis contour attachment, and a tape unit for the l-AC, single spindle, automatic chucking machine.

GE engineer, Glen E. Guy, demonstrates the company's new, compact, solid state, supervisory control equipment. Master station unit (left) provides glance indication and control of remote operations. At right is remote station unit

GE Shows Remote Control

GENERAL ELECTRIC CO. has unveiled an innovation in supervisory control of remote operations: A transistorized system with no moving parts that will handle any job demanding remote metering, monitoring, or control.

It is functionally compatible with conventional GE relay-type systems and is designed to replace such equipment. Compared with an all-relay system, the new equipment takes up to 50 per cent less floor space, is simpler to install, weighs up to 25 per cent less, requires less maintenance.

Designed to operate on any two way communication channel—including telegraph grade wire—it uses GE's space code, a system of pulses and pauses, to transmit information. A check back feature rules out the possibility of a wrong code operating remote equipment.

Produced by GE's Medium Voltage Switchgear Dept., Philadelphia, the equipment will find initial applications in utilities, industrial power systems, the petroleum industry, and the chemical industry. It is expected to get attention from the steel industry and other areas of metalworking where remote control is advantageous. The power distribution system in any large plant is a potential market. Other applications will include irrigation and water supply systems, light and air conditioning control, tunnel ventilation, and city traffic control.

Orders have already been placed by two utilities—Western Massachusetts Electric Co. and Colorado Central Power Co.

Modern Heat Treating Helps Firm Compete

After loading the first rack of parts, operator starts heat treating cycle; machine repeats until it is stopped

Isothermal method reduces production costs and improves properties (combination of hardness and ductility) of replacement parts for farm implements, reports Empire Plow Co.

IMPROVED heat treatment of replacement parts for agricultural equipment has helped a 120-year-old company increase its share of a highly competitive market. Empire Plow Co., Cleveland, built its production to the point where round-the-clock operation of its heat treating line no longer could keep pace with sales.

Installation of a second line, a modernized version of the first and of equal capacity, was completed recently. And now both lines are running close to capacity. In a single month, the volume of heat treated work exceeds 1 million lb.

• Service requirements for modern agricultural equipment are severe.

In the Texas Panhandle, for example, frictional temperatures of implements are so high that some heat color can be seen at night. Tools move through the resistant soil at 7½ mph, and the cooling properties of the earth are limited by its low moisture content.

High speeds pose another problem. Moving implements hit obstructions with great impact. So ductility is an added requirement.

• The replacement market for equipment is competitive.

Pricing structures preclude the use of high alloy steels to gain the desired toughness combined with wear resistance. Yet conventional heat treating of a low alloy steel would only upgrade wear resistance at the expense of ductility, says the company.

• Empire Plow decided that isothermal heat treatment offered a potentially practical method for developing a desirable combination of properties in an 0.80 carbon steel.

Field tests indicated that the process produces higher hardness and good toughness. So some 12 years ago, Empire Plow installed a mechanized salt bath line for the heat treatment of cultivator sweeps, harrow discs, plow points, and similar parts.

User acceptance of the heat treated parts has increased steadily. While sales of other farm products were dropping off, Empire's production held at a satisfactory level.

• The two heat treating lines are quite different in appearance, although they perform the same steps.

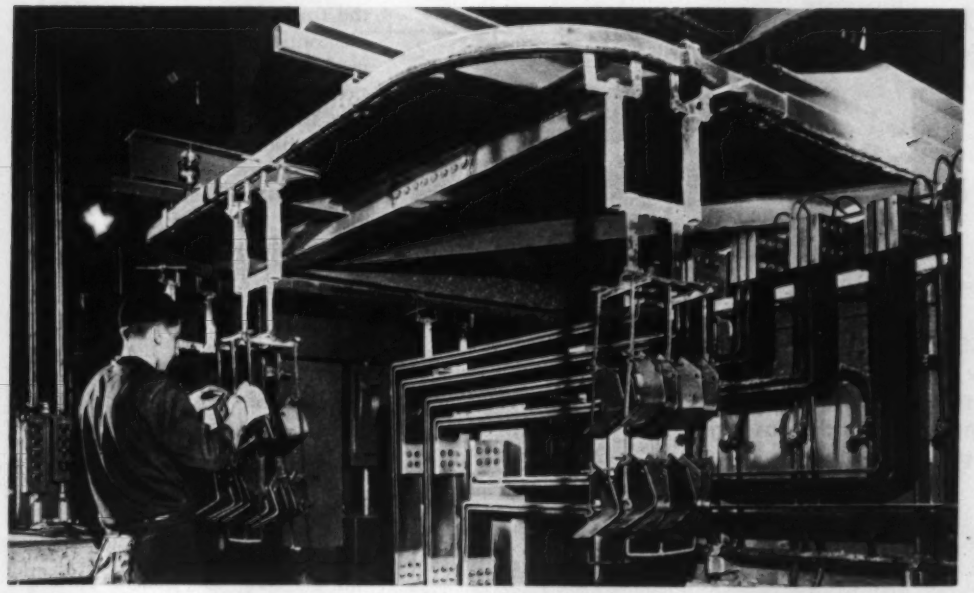
The range of parts being treated requires flexibility in handling, so fixture supports are used. Racks of various types are attached to hold the work. Each part is supported separately for uniform heating and quenching. All furnaces are salt bath units, so parts must be lifted vertically from the salt, moved horizontally, then lowered into the next stage of the cycle.

The older furnace line is a jack rabbit unit—fixtures carrying the work rest on two drive chains which carry them forward. When the fixtures reach the end of each furnace, they are picked up by another set of chains (moving more rapidly) which lift them, move them forward, then lower them.

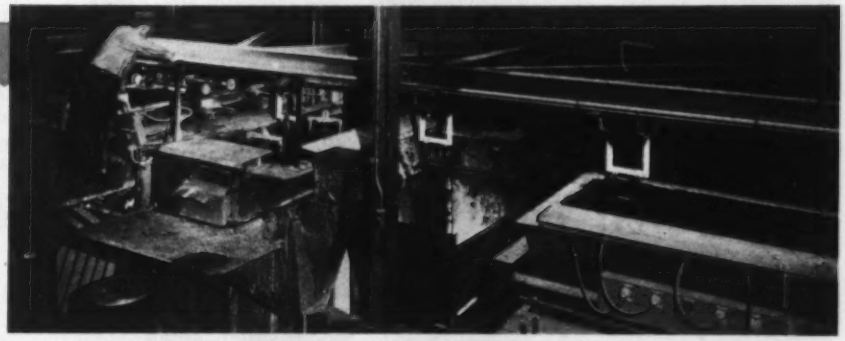
The sequence of operations is a straight line; parts may be returned overhead for unloading.

• The newer unit employs an elevator mechanism.

A single drive chain moves in a track which forms a rectangular path that has rounded corners. (Other shapes could be used, and



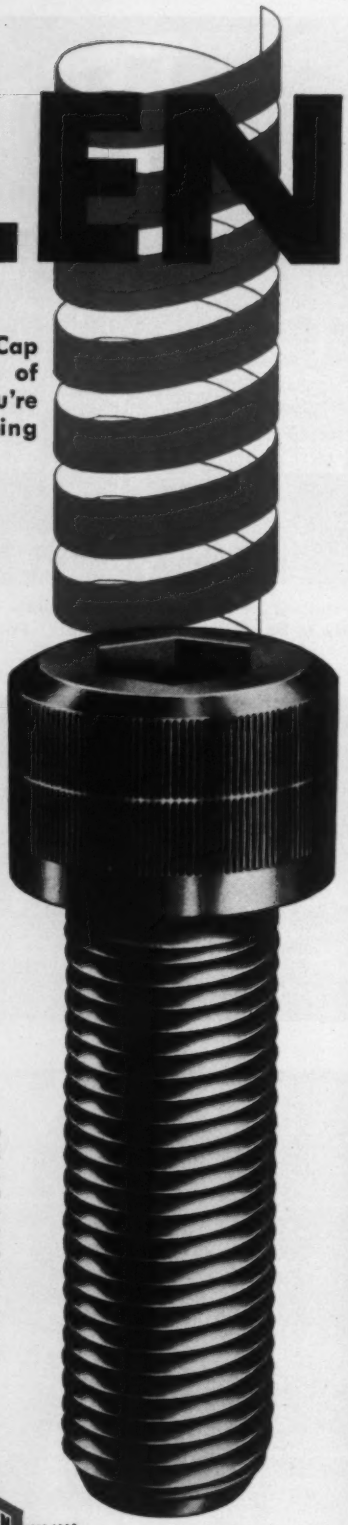
Extra stations permit loading rack, while another, already filled, is ready to be charged to the furnace. Parts are held individually



With elevator track down, work is in furnaces, air cool station, wash and rinse tanks, and the load and unload positions

With elevator raised, fixtures index one position forward, ready for the next operations

ALLEN



The cost of ALLEN Hex-Socket Cap Screws is only a minor fraction of your assembly costs . . . be sure you're getting the timesaving, cost-saving advantages of genuine Allens!

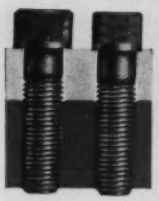
Ever since Allen first produced the hex socket head screw nearly fifty years ago, specifying *genuine* Allens (made by Allen of Hartford) has been a sure way to guarantee dependable threaded fastening.

Only *genuine* Allens have Leader Points that make starting easier, and greatly minimize danger of cross threading. *Genuine* Allens are "pressur-formd" to preserve the long fibers uncut throughout the length of the screw, giving stronger sockets for greater tightening torque.

Write for samples and engineering data. See how *genuine* Allens will make your product better.

ALLEN HEX-SOCKET SCREWS HEAD

Allen's new 1960 Series Socket Head Cap Screws give up to 2½ times more load carrying capacity, without indentation. Head diameter of sizes from ¼" up is now uniformly 1½ times the body diameter—providing more under-the-head bearing surface, and a proportionate increase in clamping force. Write for new Bulletin G-25, with full specifications.



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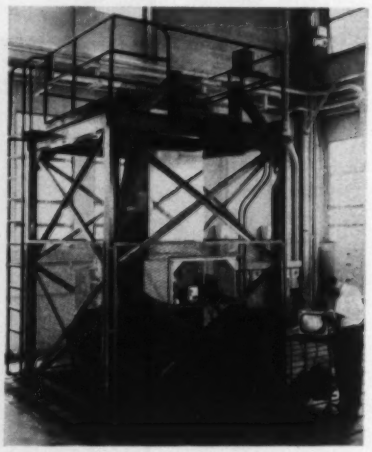
the track does not need to be in a horizontal plane, but there was no need for a more complex configuration.) Since the chain is continuous, the work returns to the starting position for unloading.

The entire track is movable vertically and counterweighted; the rise and fall cycle is driven by a system of hydraulic cylinders. A separate cylinder system provides the forward indexing motion which simultaneously moves all fixtures ahead one position. Longer heating times are obtained by using a furnace containing several positions; varying the cylinder travel changes all parts of the cycle.

A neutral salt high heat furnace operates around 1600° F for austenitizing. Quenching in nitrate-nitrite salt at 450° F follows. After an air cool, the treated parts are tempered at about 900° F for further toughness.

A washing station is provided with two countercurrent rinses and a spray rinse position to remove the heat treating salt. Additional stations, not now used, were included, so that phosphatizing or painting could be incorporated.

Both furnace lines were supplied by Ajax Electric Co., Philadelphia, through Anderson-Bolds Inc., Cleveland.



TV MONITORS speeding tin strip in an experiment aimed at improving quality control. Place: U. S. Steel's electro-mechanical engineering building, Monroeville, Pa. The technician is checking for crystal formations. A stroboscope light "stops" the tin for the picture

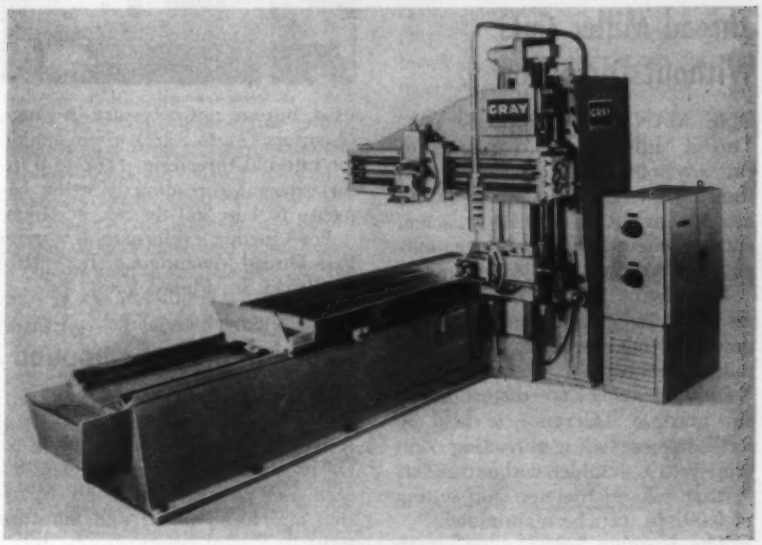
Open Side Planer Handles Carbide at High Speeds

HERE IS a low priced, open side planer (called the Flying Scot) that can handle carbides at high speeds. Table speeds range 30 to 300 fpm. A 60/75 hp variable voltage drive produces 10,000 lb of table thrust.

Optional duplex tables help reduce setup time. You can get single or double cutting heads. The planer is available in nine combinations of table widths and heights. Basic sizes are 30, 36, and 42 in. The components are designed to resist torsional deflection and vibration under heavy cuts in either direction. Standard planer ratio is 6:1.

A pendant station completely controls table movement.

For further information, *write* G. A. Gray Co., 3611 Woodburn Ave., Cincinnati, Ohio.



Fork Truck Carries Full Load Up 10 per cent Grade

THIS 4000 lb capacity electric fork truck is equipped with carbon pile drive control. Working through a hydraulic circuit, the control permits steady stepless acceleration for "inching" operations.

Dual field series windings in the drive motor provide high torque and improve efficiency throughout the speed range. The unit can climb a 10 per cent grade while under full load. Maximum speed is 6.2 mph (forward or reverse). With the standard upright, lift speed is 36 fpm (loaded) and lowering speed is 70 fpm. Outside turning radius is 70 in.

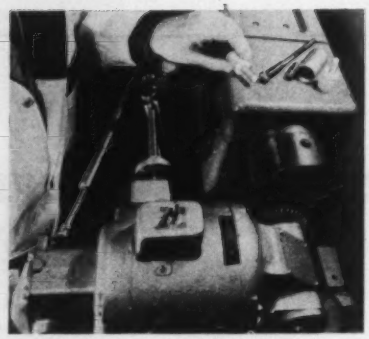
Clarklift nested roller uprights are standard. On special order you can get a triple stage upright. The truck is 117⅜ in. long (with 40 in. forks), has a 47 in. wheelbase, and is 38 in. wide. It weighs about 7850 lb with batteries.

The contactor panel is in the truck's counterweight and is protected by a steel cover. Detachable

hood and side plates permit top and side removal of the battery.

For further information, *write* Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Thread Miller Cuts Without Distortion



ONE MAN can set up the Fen-Thread Miller in 4 to 5 minutes to cut any 60 degree, Acme, square thread, or multiple threads. The attachment fits on 9 to 20 in. screw cutting engine lathes. It's a self-powered unit with a ⅓ hp motor.

The engine lathe is only used to set pitch and root diameters. Lathe power is not required. One pass mills any thread smoothly and cleanly, leaving no distortion or rip marks. Tolerance is held to 0.001 in.—including threading completely to a shoulder without undercutting. A micrometer stop setting of 0.001 in. can be maintained.

The portable unit can mill such materials as Teflon, Nylon, Plexiglass and Fiberglas. Coolants may be used, but are not necessary. A range of cutters (½ to 9 in.) are available for internal threading, 1/32 to 9 in. for external threading. Cutting capacity is 4 to 200 threads per inch.

For further information, *write* Fen-Thread-Machine Co. Inc., 3107 N. Broad St., Philadelphia, Pa.

Rust Inhibitor Compound Doesn't Require Mixing

A RUST inhibitor called Poly-Rustex uses an oil-carrier base. The ingredients penetrate through corrosion and form an air and moisture tight seal.

The material will not discolor metals. It comes ready to use and can be applied to metal surfaces by brushing, spraying, mopping, or dipping.

One gallon covers up to 400 sq ft. It's low in viscosity, nonsettling, nonfreezing, and can be stored indoors or out.

For further information, *write* Brad Chemical Inc., 111 W. Washington St., Chicago 2, Ill.

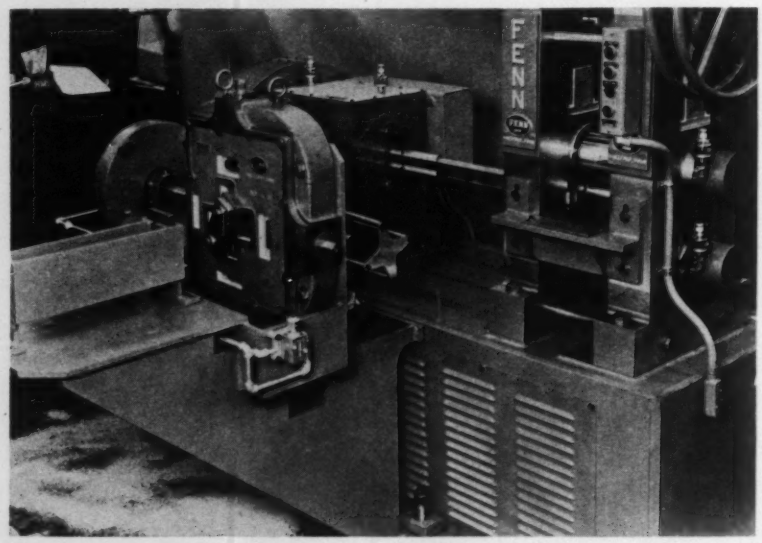
Fork Lift Truck Does Right Angle Stacking

STACKING and pickup operations can be performed in a 6 ft aisle by Towmotor's Model 590 fork lift truck.

The front end of the unit can pivot 90 degrees to the right or left for right angle stacking or load pickup. Outriggers stabilize the truck laterally during pivoting. Lifting speed is 70 ft. per minute.

Towmostatic drive eliminates transmission, drive line and differential, and provides single pedal directional control. Another new series of lift trucks (Van-Stack) is designed for 3 ft warehouse aisles and for driving into low headroom trucks and boxcars.

For further information, *write* Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio.



ROLLING MILL CAN DRAW WIRE. This machine meets requirements for versatility and compactness. The unit includes (on a common base) a two high, four high, three way precision rolling mill, and a wire drawing attachment for producing shapes from round wire (squares, rectangles, trapezoids). The wire drawing attachment includes a draw die box, a Model 4U turk's-head, and a shedding type drum. For further information, **write** Fenn Mfg. Co., Fenn Road, Newington, Conn.

Electron Beam Vaporizer Does Metal Coating

AN ELECTRON beam evaporating unit capable of vaporizing metals (including tungsten, tantalum, columbium, and molybdenum) is available from Alloyd Corp. The unit (Model EVB-3) requires commercial vacuum equipment operating at 3×10^{-4} millimeters of mercury or lower. It's designed for research and development or volume production of thin film coatings for microminiaturized electronic circuitry, optical filter films, and similar applications.

The package unit includes an electron beam gun, extra filaments, power supply, control panels, and electrical feedthroughs. It is rated at 250 milliamperes at 10 kv and operates on standard 120 volt, 60 cycle ac, 15 amperes power. Optional equipment includes a 1000 volt bias supply for the gun to limit the zone

NEW IDEAS IN COPPER ALLOY ROD AND WIRE

Interesting things happen when you add a spot of zirconium or chromium to copper—four high-conductivity coppers that boost production, cut cost of machining—even plain old free-cutting brass rod is going fancy.

There's a quiet revolution going on in copper metallurgy. Research and development teams are expanding the useful knowledge of copper and copper alloys in an effort to define the properties most suitable for specific engineering applications.

STABILITY at elevated temperature, combined with good electrical conductivity, is probably a combination most sought after by design engineers and by our industry's research teams. Two alloys are now commercially available, and the alloy systems are unique. Chromium copper and zirconium copper are heat-treatable alloys with good stability of mechanical properties up to temperatures in the order of 600 F.

CHROMIUM copper in the fully heat-treated condition following a solution anneal will exhibit properties combining a tensile strength of about 75,000 psi with conductivity of approximately 80% IACS. Zirconium copper has good stability characteristics at elevated temperatures and conductivity of 90 to 95% IACS; the strength properties developed by heat treating are, however, somewhat lower than chromium copper.

SEVERAL other heat-treatable copper alloys with intermediate properties are gaining recognition in the connector and electronics fields. These alloys fall into a conductivity range of 35 to 65% IACS, with tensile strengths 90,000 to 100,000 psi. The most popular alloy systems are the copper-nickel-phosphorus and copper-nickel-silicon series with modifications for free machining or other specific requirements. These alloys have a solution annealing temperature about 100 to 200 C lower than the chromium and zirconium coppers.

THE WIDESPREAD use of panel or harness construction for linking segments of electrical control devices has made the requirement for free-cutting coppers mandatory. Screw machine shops are fabricating these connector components of various designs by the millions. Currently the most popular free-cutting coppers are leaded copper with conductivity of about 98% IACS, and tellurium and sulfur coppers at about 95% IACS. Some of these free-cutting coppers have residual oxygen and can become brittle or gassed under the usual conditions contributing to this phenomenon. All, however, can be obtained with a combination of deoxidizers or oxygen-free copper. In the case of the deoxidized variety, some slight sacrifice in conductivity will be noticed. Ordinary usage very seldom requires conductivity in excess of 90% IACS – and this presents no problem for these coppers.

ALL of these coppers can be cold worked without too much trouble. They can be supplied in a suitable wire temper for cold heading and secondary operations designed around the basic alloy system. Up to now there has not been too much interest in these alloys for wire forming or heading operations. Close dimensional tolerances may be the reason for the reluctance of the heading people to get into the electrical connector business. Alloys are available with the ductility and mechanical properties necessary for this type of forming. It would appear that some of the products could be made more economically by cold-heading or wire-forming operations.

RECENT TRENDS have also affected the old brass and copper reliables. There can't be any product more prosaic than free-cutting brass rod; it is the cheapest of such commodities and at one time was the easiest to process—all one had to do was to extrude, draw to finish dimensions, and ship. In many cases this practice won't work today. Deep drilling, roll threading, knurling, staking, slotting, etc., have complicated the picture, but the latest efforts of the screw machine builders have laid this ghost to rest. We now hear of beta-free rod for close tolerances on deep-drilling applications. Similar grain structures, but not necessarily the same temper, are required for roll threading, knurling and staking or whenever extra ductility is needed. Along with the consideration of grain structure, it has been necessary to take advantage of the broad chemical composition range for free-cutting brass. Most suppliers divide the standard range into two parts, utilizing the lower copper range for the larger sizes that will normally be machined on the heavier, faster screw machines where chip breaking and clearing the tools are the most important considerations. This might be considered the rough, breakdown type of stock.

FOR the smaller diameters, specialization has been the watchword. Depending on specific needs, you can now obtain free-cutting brass rod with all-alpha, fine-grained structure or an alpha-beta fine-grained extruded structure, or possibly a combination of both. For certain applications you might need a coarse-grained, all-alpha structure. Lead dispersion and lead content are other variables that can and will be controlled to meet fabricating or end-use requirements.

IN the cold-heading industry, advantage is being taken of the wider selection of copper and copper alloys that is available today. The nickel silvers, phosphor bronzes, and silicon bronzes combine good ductility and high strength with excellent corrosion resistance. The whole range of common brasses has specific applications and can be tailored to various heading operations.

The research and development hopper is full of interesting new ideas and projects at The American Brass Company. It could be that we're working on something which would help solve one of your problems. Even though we don't have the complete answer, perhaps we could both reach a solution faster by pooling our efforts. Call your American Brass representative and talk it over with him or write: Manager, Market Planning, The American Brass Company, Waterbury 20, Conn. 6058

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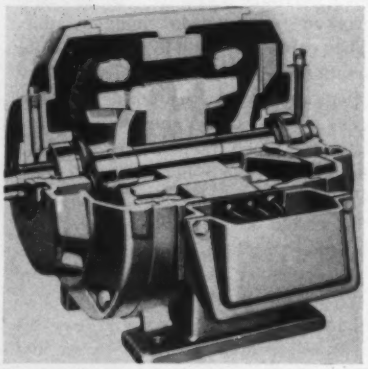
of evaporating coverage from the vapor source, and a motor driven feed to supply evaporating metal continuously to the vapor source.

For further information, *write* Alloyd Corp., 35 Cambridge Parkway, Cambridge 42, Mass.

Weatherproof Motors Are Rated 1 to 125 hp

YOU can get these ac motors in frames 180 through 445U (1 through 125 hp) from Reliance Electric & Engineering Co. A selection of standard speeds and voltages is available.

The motors use an epoxy encapsulated insulation system that protects stator windings from moisture, oils, dust, chemicals, acids, and alkalies.



The Metermatic system lubricates the deep groove, double shielded ball bearings. A metering plate helps keep out contaminants and regulates grease flow to the bearing. A stainless steel nameplate helps keep motor information legible.

For further information, *write* Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Rail Straightening Press Handles 6 to 8 ft Bends

A HYDRAULIC rail straightening press can automatically handle bends having a 6 to 8 ft radius. By putting an outboard sensing device on the exit side of the press, it's possible to straighten longer bends

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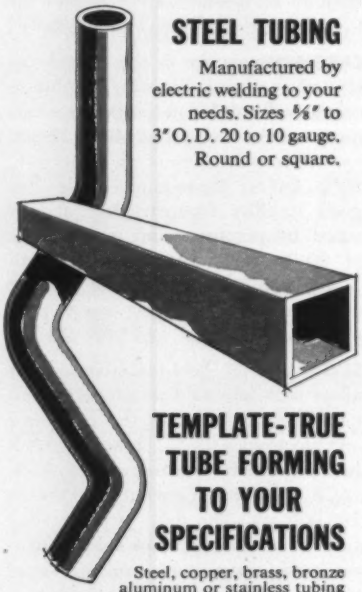

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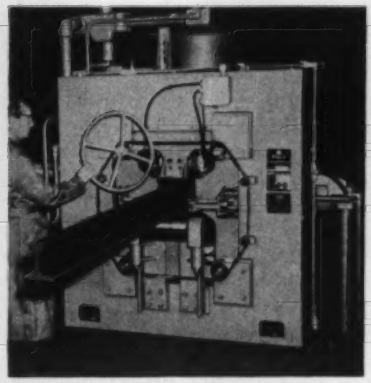


by working at 6 to 8 ft intervals through the bend.

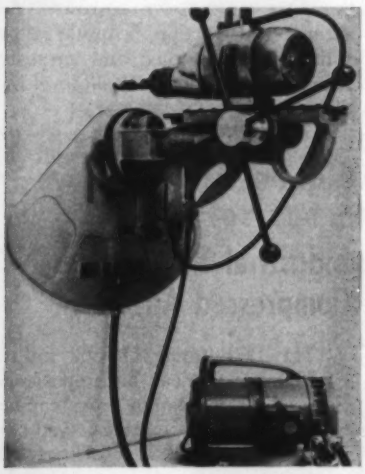
The press has two cylinders with 200 tons of pressure and two with 80 tons of pressure. A conveyor system feeds the material through the press. Directions of bends and their location are indicated automatically. The press has pressure blocks which are adjustable to operate on 30 to 51 in. centers.

For further information, *write* Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, a division of Koehring Co.

Portable Drill Stand Has Vacuum Operated Base

A NEW portable drill stand with a vacuum (3000 lb holding force) base can fasten itself to any nonferous material for quick, easy drilling.

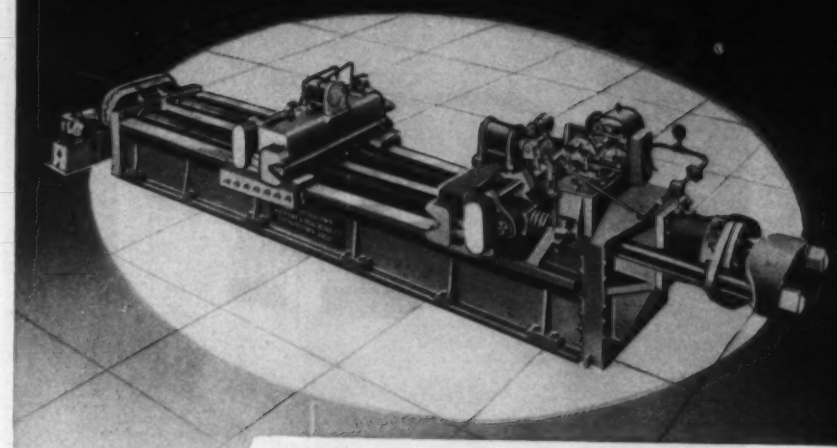
The Vacu-Press has a radial positioner which provides freedom to rotate the drill point a full 190 degrees about the vacuum base with lateral movement up to 1⅛ in. for



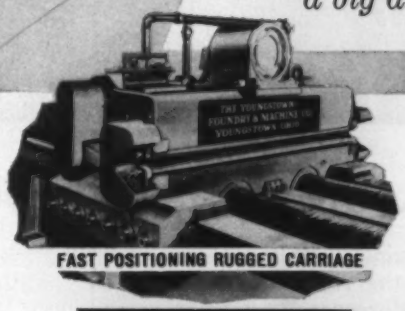
"YOUNGSTOWN"

New Carriage-Type Design

STRETCHER LEVELER



a small difference in design makes a big difference in RESULTS...



FAST POSITIONING RUGGED CARRIAGE

WEDGE TYPE HEADS with WAFFLE TYPE GRIPPER JAWS assure flatness of sheet-ends.

Rugged Three Way fabricated Steel Bed insures utmost rigidity

- *CONSERVES VALUABLE FLOOR SPACE*
- *SPEEDS STRETCHING OPERATION*
- *AIDS QUALITY CONTROL*

The Hydraulic Stretcher Leveler pictured is 800,000# Capacity capable of stretcher leveling mild cold rolled sheets 30″ to 62″ wide, 30″ to 168″ long, up to .180″ thick in either single or multiple sheets.

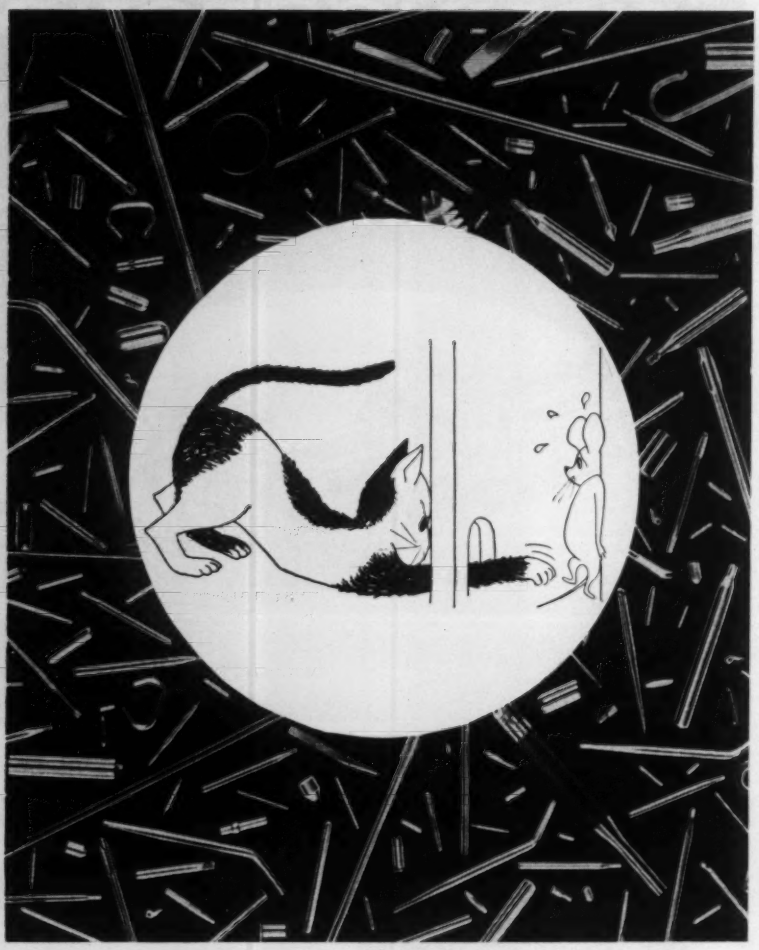
A complete range of sizes . . . built from 10,000# for aluminum extrusions to 2,000,000# for stretching plate. New performance throughout a long life of service is assured by traditional "YF&M" rugged construction. Write for Complete Information.

The Youngstown Foundry & Machine Company

Serving Industry Since 1885

Youngstown 1, Ohio

33



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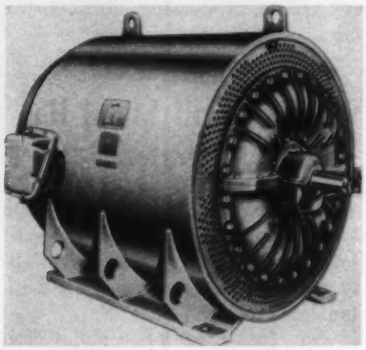
positioning after the base has been activated on the workpiece. The portable unit weighs less than 65 lb and is adaptable to all makes and models of portable drills.

For further information, *write* Bux Magnetic Products Inc., 1355 N. Tenth St., San Jose 12, Calif.

Tube Cooled Motors Rated up to 2000 hp

TUBE cooled, air to air heat exchanger motors (standard, enclosed units) up to 2000 hp can be used in nonhazardous locations and in explosion proof construction. They carry the Underwriters' Laboratories' Class 1, Group D label.

The motors resist excessive moisture, oil vapor, chemicals, alkalies, coolant and airborne dust, sand, dirt, and metallic particles. They

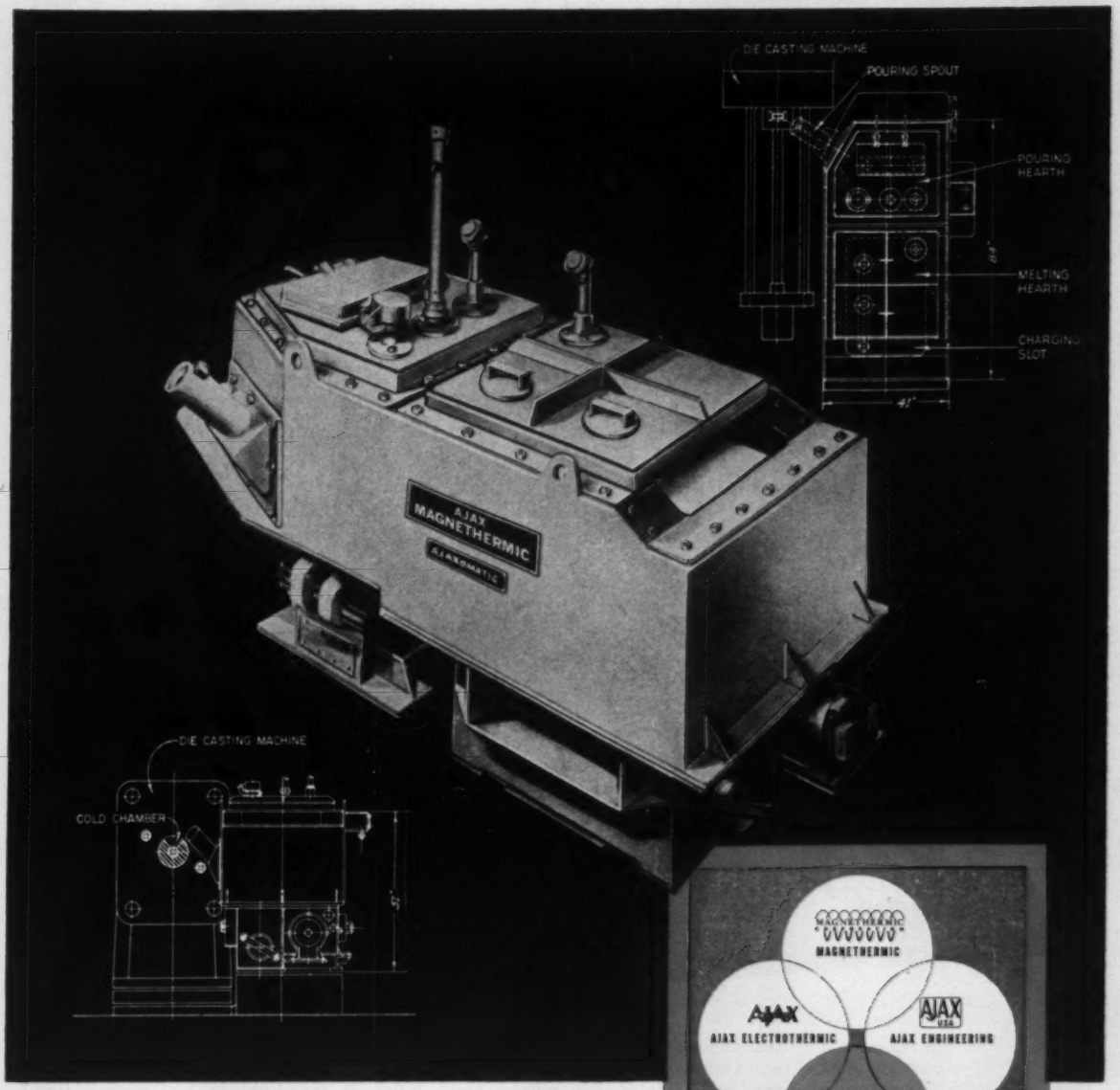


can be connected to pumps, compressors, fans and blowers, mixers, mills, crushers, conveyors, presses, and special industrial machinery. Standard units have corrosion resistant construction, capsule type split sleeve bearings, and pressure lubricating systems with oil level indicators.

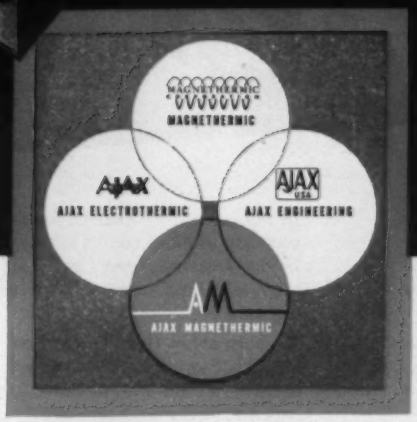
For further information, *write* Dept. P, Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.

Industrial Burner Uses Compressed Air, Gas

WITH THE Grigg G-5662 industrial burner, you can burn off armatures, burn insulation from copper wiring, degrease castings, and do other similar work. It meets strictest



Duplex Ajaxomatic for melting and holding metal for automatic casting operations.



WATCH AM

FOR THE NEW IDEAS IN HEATING AND MELTING BY INDUCTION

The Automatic Pouring Ajaxomatic, one of many products by AM, for the heating or melting of metals by Induction.

"induction heating is our only business"

AJAX Magnethermic CORPORATION

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930 Lower Ferry Road
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3990 Simon Road
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In miniaturized products, fastening delicate components securely in place can be a major production "headache". If the fasteners used are not accurate, uniform and easy to install, assembly operations become a costly nightmare.

To help solve this critical problem, Fischer is supplying precision turned miniature nuts that are tapped square (within 1°) to Class 2 tolerances, with lengths and diameters held to +.000″ and −.005″. Sizes range from ⅛″ hexagon and include standard, special and odd size or shape nuts with standard or special threads from No. "0". In addition, all Fischer nuts are furnished burrless, cleaned and ready to use.

Whatever your application, if you require extreme accuracy and prompt "on schedule" delivery at competitive prices . . . let Fischer quote your next miniature nut order.

WRITE TODAY FOR ADDITIONAL MINIATURE DATA.

there's no premium for precision at

Fischer SPECIAL MFG. CO.

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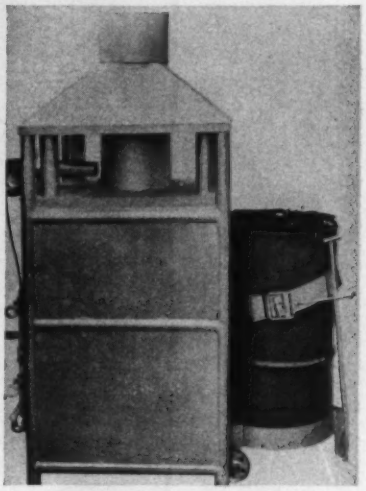
8814-FS

NEW PRODUCTS and equipment



air pollution regulations (no smoke or odor), says the company, adding that articles are not damaged or distorted.

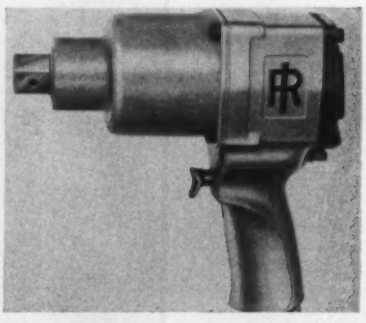
The unit has a burning drum cart and an afterburner. It operates on compressed air and gas for top efficiency or on gas alone. Items to be burned are loaded in the drum and wheeled to the burner.

For further information, *write* Grigg Specialty Tools, 8103 Marbrisa Ave., Huntington Park, Calif.

Tool for Nut Running Has ¾ in. Bolt Capacity

A HEAVY duty Impactool with 91 per cent faster rundown speed has been developed by Ingersoll-Rand. The 810 model delivers 1000 impacts per minute, with a free speed of 4300 rpm.

A direct drive between the motor and hammer gives greater torque and speed to make the tool ideally suited for heavy duty nut running.



Immersion Ultrasonic Testing is the latest addition to Standard's family of extensive quality-control facilities. Specially designed for Standard and one of the first of its kind installed by a specialty steel maker, this new facility is used to detect minute flaws in extremely high quality thin-section and complex-section steel shapes.

It is essential to test for internal flaws in such vital jet and missile engine parts as expander rings, motor case rings, turbine discs, and compressor wheels. Bring your next difficult alloy problem to us—you'll appreciate our personalized service as well as our superior quality control. Write for free illustrated booklet, "Quality Control at Standard."

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Adams Aftercoolers provide superior condensation of pipeline oil and water vapor by reducing gas or air temperature to within 10° of cooling water. This performance, unique in the industry, is made possible by Adams' specialization in these units for over 25 years. During this time, mass-production techniques have developed these superior design features at a lower purchase cost:

12-PASS WATER CIRCULATION — provides maximum heat exchange from tube bundle — cooler discharge air.

FREEDOM FROM OPERATING TROUBLES — full floating rear tube sheet compensates for expansion. Floating tube sheet is machined parallel after rolling to assure long life to packing seal. Packing gland is locked rigidly in place on adjustable studs to isolate pipe line expansion strain, thereby protecting the packing.

ADAMS CYCLONE SEPARATORS have an exclusive cyclone design for maximum extraction of oil laden condensate; their separation efficiency is constant over a wide range of loads — features not found in other separator designs.

WRITE TODAY for Bulletin 714 for the engineering details that make Adams your best value for clean, dry, cool compressed air or gas.

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LARGE FASTENERS
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FREE DATA ON LARGE FASTENERS
Describes all types of large fasteners for heavy machinery, power plants, bridges, ships, dams, docks, atomic plants, foundations. Write for Bulletin 160, Joseph Dyson & Sons, Inc., 5125 St. Clair Ave., Cleveland 3, Ohio, Phone HE 1-6157.
DYSON
NOTHING'S TOO BIG FOR A DYSON LARGE FASTENER!

NEW PRODUCTS and equipment

It has a ¾ in. bolt capacity.

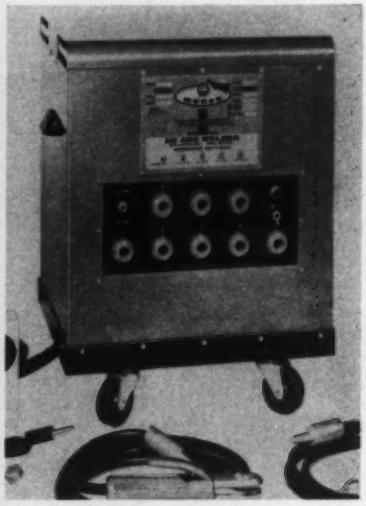
A ¾ in. square drive is standard equipment. For special applications, it's available with 3, 6, or 8 in. extended anvils with a ¾ in. square drive, a 1 in. square drive, or a quick change anvil with a ⅝ in. hexagon recess.

For further information, *write* Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Line of Arcwelding Units Are Medium Duty, Portable

A LINE OF portable, arcwelding units rated at 180 amperes is designed for medium duty applications in small manufacturing plants and in maintenance.

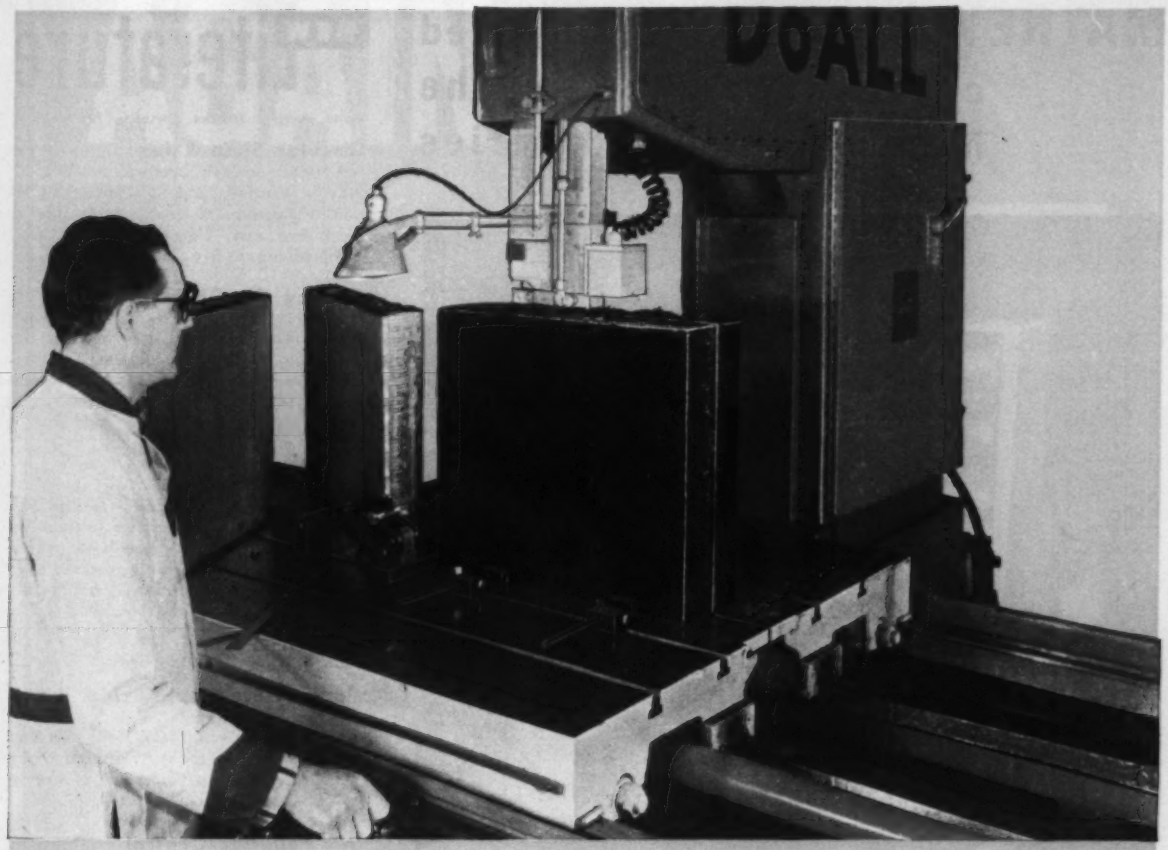
Automatic, built-in, volt-arc characteristics provide deep penetration at high amperage settings, and soft arc at lower settings for light gage metals. The units have no moving parts and come with electrode



capacities from 1/16 to 3/16 in. in diameter. Two models in the series are equipped with 6 ampere taper chargers for 6 or 12 volt storage batteries.

The units operate from a 230 volt ac source and provide 15 to 180 amperes of welding current. Welding accessories are included with the unit.

For further information, *write* Metal & Thermit Corp., Rahway, N. J.



Half-Ton Slabs of Tough Analysis Steel Split in ½ Hour on DoALL Band Mill

This DoALL band mill makes light work of heavy sawing jobs. It offers a new, fast, low-cost way to machine king-size workpieces—accurately and with excellent finish.

Seven large blocks of tough, special analysis steel, each 19¾ in. x 23 in. x 7 in. and weighing 1,000 lb., were split at a cutting rate of 5 sq. in./min. Despite this fast cutting rate, flatness was held within .010 in. T.I.R., using a Demon® h.s.s. saw band and DoALL No. 240 cutting oil. After seven cuts, or approximately 3,180 sq. in., there was no appreciable wear on the saw band.

The large-capacity, variable-speed fluid drive worktable of the DoALL band mill supports workpieces weighing up to 4,000 lb.—with positive feeds from .03 to .80 in./min. Fixturing and power consumption are lower in cost than found in any other machining method.

To increase your productivity, investigate this money-saving, money-making machine today. Call your local DoALL Sales-Service Store.

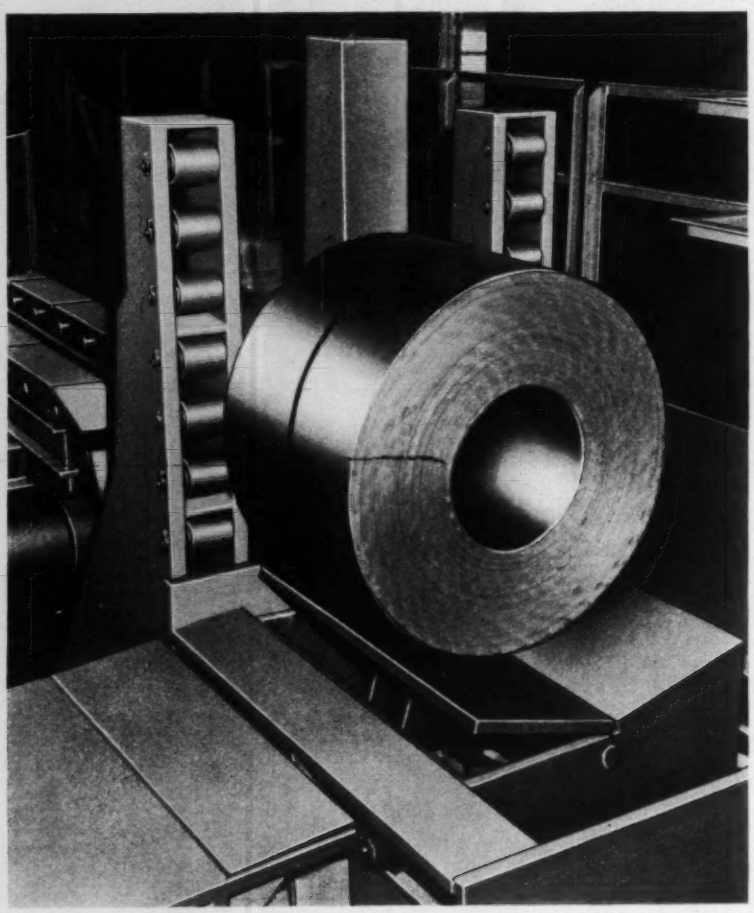
All machine functions of the DoALL band mill are controlled from the station shown above. Additional controls are located on the column.

B-64

This is a typical DoALL Store

The DoALL Company, Des Plaines, Illinois

MATHEWS . . . A fully integrated conveyer service for the Metalworking Industries



• With 3 large modern plants, competent people in engineering and manufacturing, and 55 years of experience in mechanized handling, Mathews makes available to American and Canadian manufacturers a conveyer service complete in every detail, from proposal engineering through installation.

That is why we can confidently say, when you buy Mathews Conveyers you're sure to get outstanding performance.

GENERAL OFFICES — MATHEWS CONVEYER COMPANY, Ellwood City, Pennsylvania
WESTERN DIVISION — MATHEWS CONVEYER COMPANY WEST COAST, San Carlos, California
CANADIAN DIVISION — MATHEWS CONVEYER COMPANY, LTD., Port Hope, Ontario, Canada

Over Fifty Years of Leadership in Mechanized Handling

MATHEWS

NEW Literature

Write directly to the company for a copy

Circular Slide Rule

A pocket size calculator can aid in mulitplying, dividing, and in finding proportions. Operation of the circular rule is quick and easy. General Industrial Co., 1788J Montrose Ave., Chicago 13, Ill.

Cutting Oil Chart

Volume 5, No. 3 of *Die Headlines* shows an oil chart that can aid in selecting the proper grade of cutting lubricant for various materials. Eastern Machine Screw Corp., Truman & Barclay Streets, New Haven 6, Conn.

Technical Literature

"Technical Publications List" mentions 46 technical papers, articles, reprints, and data sheets which summarize research on high alloy castings. Categories include alloy selection, applications, research (corrosion and high temperature), engineering data, fabrication, and foundry practice. Alloy Casting Institute, 1001 Franklin Ave., Garden City, N. Y.

Factory Air Conditioning

A booklet entitled "Will Factory Air Conditioning Pay Off for Me?" tells how a system can pay for itself or even return a profit in industrial operations. Carrier Corp., Carrier Bldg., Syracuse, N. Y.

Air Pollution Control

A 20 page engineering and technical manual covers Oxycat oxidation catalyst systems for industrial processes. The information covers air pollution control, waste heat recovery, and condensate elimination. Oxy-Catalyst Inc., Berkley Rd. & Lancaster Ave., Devon, Pa.

NEW BOOKS

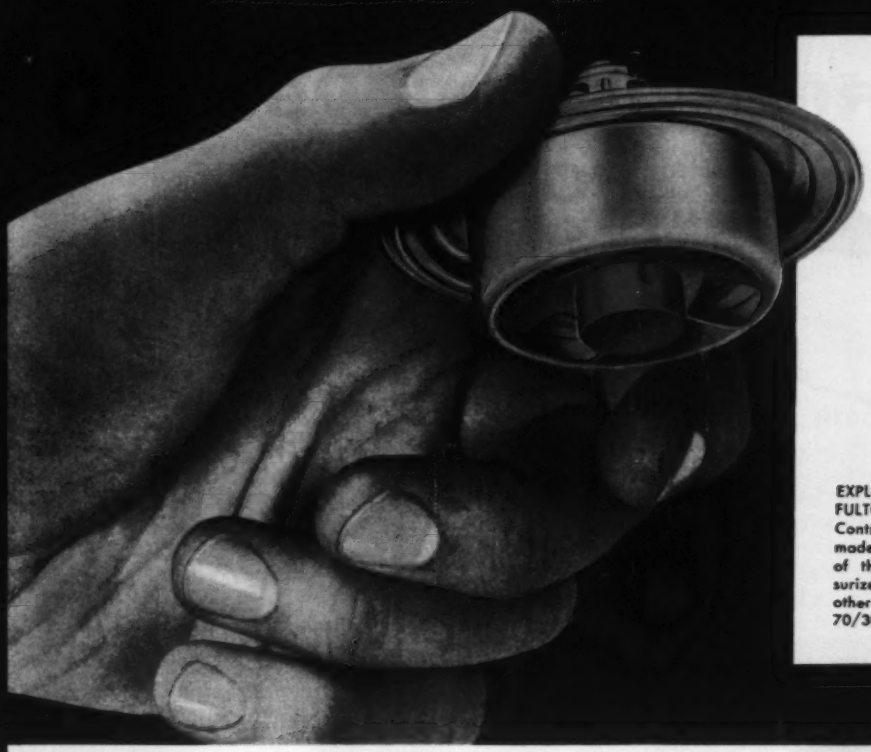
Centrifugal Pump Application Manual, Buffalo Pump Div., Buffalo Forge Co., Dept. 56, 490 Broadway, Buffalo, N. Y., 227 pages, $5

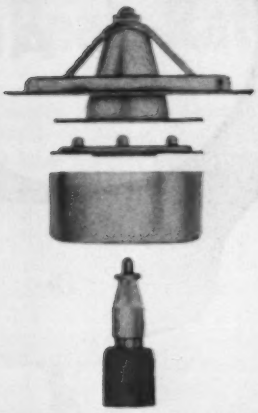
The manual treats principals of centrifugal pump operation and such considerations as viscosity effects, cavitation and suction lift, temperature rise in pumps, packing and seals, installation, and troubleshooting. Reprints of the centrifugal pump and data sections of the standards of the Hydraulic Institute are included as a reference.

Titanium Welding, American Welding Society, Dept. T, 33 W. 39th St., New York 18, N. Y., 24 pages, $1.50

Best methods for welding titanium piping and tubing by the gas tungsten-arc process are discussed. Included: Process, power supply, electrodes and filler metal, titanium grades, joint design and preparation, cleaning, gas shielding, welding techniques, heat treatment, and weld quality tests. The information was obtained from welding literature, company files, research laboratories, and colleges.

AGAIN-





EXPLODED VIEW OF AUTOSTAT® made by FULTON SYLPHON DIV., Robertshaw-Fulton Controls Co., shows impact extruded cup made from Revere Copper Rod. Other parts of this superior thermostat used in pressurized cooling systems in automobiles and other automotive equipment, are made of 70/30 Revere Brass Strip.

Revere helps "fit the metal to the job"

AND A LEADING MANUFACTURER OF AUTOMOTIVE THERMOSTATS IS ABLE TO PRODUCE A SUPERIOR PRODUCT FOR LESS MONEY

That little unimportant-looking copper cup shown above originally posed a king-sized production problem. It is a critical part of a newly designed automotive thermostat made by the Fulton Sylphon Division of the Robertshaw-Fulton Controls Co., Knoxville, Tenn.

In the early stages this copper cup was machined from free cutting copper rod, but this proved costly due to the high rate of scrap from the machining operation and the relatively high cost of turning out the machined part. At this point Revere Technical Advisors got together with Fulton Sylphon Engineers and the possibility of an impact extrusion was discussed. Revere T.A.'s in turn contacted suppliers who might furnish these extrusions in copper, to see whether or not they could be produced economically and to the demanding specifications required.

After exhaustive tests it was found that the cup could be impact extruded to meet the exacting hardness specifications of Fulton Sylphon. During its development, many problems involving temper, grain size and control of the chemical composition of the copper rod had to be solved.

In addition to the Copper Cup, Revere also supplies 70/30 Brass Strip from which other parts of the AUTOSTAT® are fabricated.

Said a Fulton Sylphon purchasing agent, "When you ask Revere for help you really get results."

This is still another case of how Revere, a supplier, working with still another supplier, was able to help its customer produce a superior product for less money. Why don't you take advantage of this service?

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue

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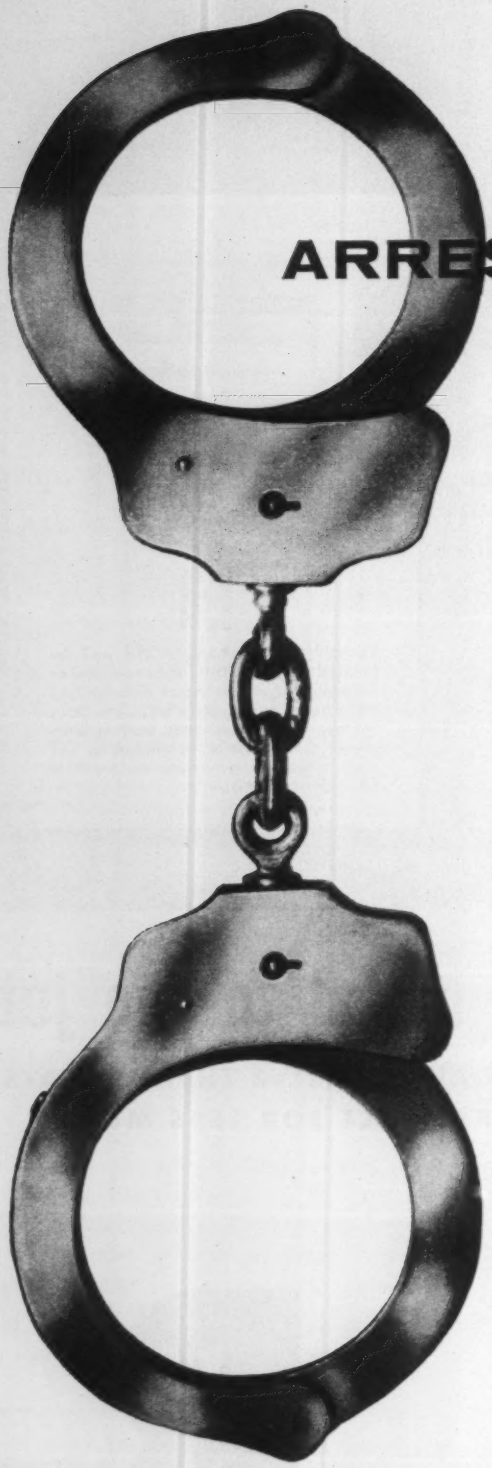
Mills: Rome, N. Y.; Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.



ARRESTING NEWS FOR THE FASTENER TRADE

. . . and all others who require quality bars and rods!

Though our name is new, Seaway Steel personnel are thoroughly familiar with the needs of the Fastener and Forging trades . . . and this experience extends from front office right straight through our plant and rolling mill.

Less than a year ago, the same men who now produce steel at Seaway, were rolling bars and rods for fellow workmen who stood by at cold headers just a few yards away, producing fasteners for Buffalo Bolt Company.

The broad fastener experience of our staff is at your disposal.

Bars and Rods of any size or shape produced to your specifications, regardless of quantity.

SPECIAL ANALYSIS • SPECIAL SURFACE FINISHES
SPECIAL HEAT TREATING • SPECIAL HARDNESS

Ask us about a delivery date on your next order. LUDLOW 9700

SEAWAY STEEL CORPORATION

101 EAST AVENUE • NORTH TONAWANDA, NEW YORK

Liquidation Nearing Peak Rate

THE STEEL inventory runoff is accelerating as mill shipments decline and consumption continues at a high level.

This month, users will chew up about 1 million more tons of finished steel than they'll receive from U. S. and foreign producers. They'll consume about 6.7 million tons, but they'll receive only 5.6 million—5.3 million tons from American mills and 300,000 tons from importers. Result: Inventories will drop to 17 million by June 30.

Since the start of the second quarter, shipments to steel users have declined steadily in the face of continued high consumption. In April, domestic shipments (6.6 million tons) plus imports (400,000 tons) exceeded consumption by 300,000 tons—boosting inventories to a first half peak of 18.5 million tons. In May, domestic shipments dropped to 6 million tons and imports to 300,000—but consumption continued at a 6.7 million ton monthly rate. Result: Inventories declined by 400,000 tons, to about 18 million. This month, the inventory runoff will be more than twice as great as it was in May.

WHEN WILL IT END?—Because of plant vacations throughout metalworking and model changeovers in the automotive industry, steel consumption won't be as great in July and August as it has been during the second quarter. In each of the next two months, consumers will probably draw about 500,000 tons from their stockpiles, reducing aggregate inventories to 16 million tons by the end of August.

In September, consumption will pick up again—probably to a monthly rate of 7 million tons—as automakers start turning out their 1961 models. Steel shipments will increase too, but the inventory runoff will probably continue. Consumers may persist in reducing their stocks by 500,000 tons a month until October or November, when inventories may drop to 14.5 million tons. Steelmakers believe that's about the minimum working level.

PERMANENT REDUCTIONS—Market analysts believe they're witnessing an inventory revolution. Buyers seem determined to stock less steel than ever before and to push the warehousing function back to their suppliers.

DECEMBER PRICE HIKES—Although most industry leaders at the American Iron & Steel Institute's annual meeting were noncommittal about raising prices when wages go up in December, Ralph L. Gray, chairman of Armco Steel Corp., declared: "I don't see how we can avoid a price increase at that time." Because of competition from foreign mills and domestic producers of nonferrous materials, steelmakers will be under pressure to absorb the added employment costs. Even so, the odds favor a price hike (STEEL, Jan. 11, p. 101).

SOME WILL HEDGE—Will buyers hedge in anticipation of the move? Some undoubtedly will. Before Dec. 1, fabricators will try to get delivery of all the steel they'll need for jobs during the winter. A major plate and structural fabricator is taking no chances on jobs that it's bidding at cost. Says a sales vice president: "We're adding $6 a ton to the cost of steel on any jobs that we might get after Nov. 1."

PRODUCTION ON SKIDS—Last week, steelmaking operations fell 3.7 points to 61.9 per cent of capacity. Output: About 1,765,000 ingot tons. Since major producers are planning additional cutbacks this week, it's apparent that operations will tumble into the fifties before leveling off.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	136	145
Reinforcing	136	146
Boiler Tubes	...	148
Canada	...	*
Charts:		
Finished Steel	...	143
Ingot Rate	142	...
Scrap Prices	...	155
Clad Steel	...	149
Coal Chemicals	...	152
Coke	...	152
Comparisons	...	143
Contracts Placed	142	...
Contracts Pend.	142	...
Electrodes	...	152
Fasteners	...	148
Ferroalloys	...	*
Fluorspar	...	152
Footnotes	...	148
Imported Steel	138	152
Ingot Rates	142	...
Metal Powder	...	152
Nonferrous Met.	158	160
Ores	...	152
Pig Iron	139	151
Piling	...	145
Plates	137	145
Plating Material	...	161
Prestressed Strand	...	148
Price Indexes	...	143
Producers' Key	146	...
R.R. Materials	...	148
Refractories	...	152
Scrap	155	156
Semifinished	...	145
Service Centers	139	151
Sheets	136	146
Silicon Steel	...	147
Stainless Steel	...	149
Strip	136	147
Structurals	141	145
Tin Mill Prod.	137	147
Tool Steel	...	149
Tubular Goods	162	149
Wire	138	147

*Current prices were published in the May 23 issue and will appear in subsequent issues.

they turn in top performance to turn out top results

SIMONDS CENTERLESS GRINDING WHEELS

top rated for fast, free-cutting . . .
high production . . . long wheel life

"Ground 70,000 pieces compared to 45,000." "Held corners and shape better than wheels previously used." "Entirely satisfactory. Gave excellent finish." These comments from users* are some reasons why Simonds Centerless Wheels are rated superior for job-to-job dependability . . . and good reasons why *your* way to accurate, lower cost centerless grinding may lie in switching to Simonds Wheels. Write for bulletin ESA 55.

*Names on request.

SIMONDS ABRASIVE CO.
Tacony & Fraley Sts.
PHILADELPHIA 37, PENNA.
Division of Simonds Saw and Steel Co.
COUNT ON / YOUR SIMONDS DISTRIBUTOR FAST SERVICE • LOCAL STOCKS

REGULATING WHEEL
Rubber bonded feed wheels exceptionally long wearing and have good traction . . . perfect mate for the Simonds Grinding Wheel.

GRINDING WHEEL
Job-proved Grain and Grade Specifications for all materials. Karvit bushed non-metallic center hole for better mounting and balance.

WEST COAST PLANT: EL MONTE, CALIF.—BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO SHREVEPORT — IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC

Rail Steel Outlook: Good as 1959

THE 1960 OUTLOOK for the rail steel bar industry appears to be reasonably good, a STEEL survey shows.

Production last year totaled 526,428 tons, and most mills expect the industry to do as well this year. Comparison: The 1959 performance was the best since 1956, when 692,080 tons were rolled. In 1950, output amounted to 806,451 tons (see table).

Rail Steel Bar Production*

(Net tons)

Year	Total
1959	526,428
1958	470,608
1957	492,975
1956	692,080
1955	636,390
1954	596,382
1953	671,768
1952	629,490
1951	702,357
1950	806,451

*Products rerolled from rails, axles, etc. Includes bars (merchant, reinforcing, and light shapes), rails, long splice bars, tie plate bars, strip.

• Over the years, rerolled products have averaged 84 per cent of the industry's total production.

Bars (merchant, reinforcing, and light shapes) make up the bulk of output. Splice bars, tie plate bars, light rails, and strip are also produced.

Raw material supplies (such as old rails and axles) are reported ample for current needs. Centralized traffic control on the railroads and normal rail replacements are making for sufficient tonnages of rerolling rails to meet the industry's requirements. Railroad trackage will eventually be reduced by centralized traffic control, but more and heavier traffic will travel over the remaining trackage, so that rail replacements should be about in the same volume as during normal years.

Some rerolling mills have electric furnaces and produce new billet steel, while others use some purchased billets, says W. H. Jacobs, executive secretary, Rail Steel Bar Association. Thus they are able to widen their product mix between rail steel and new billet steel according to customers' demands.

• The high cost of rerolling rails against the low cost of scrap frequently encourages the rail steel mills to lean toward use of new billet steel.

Significantly, however, demand for rail steel in 1959 was greater than it was in 1958, says Mr. Jacobs.

Exports of rerolling rails take a negligible percentage of the supply. Export licenses are required to move such tonnage abroad. However, exports are not limited unless it is apparent the domestic industry stands to suffer critically from shortages.

Sustained demand for rail steel is reported from the agricultural implement, bedding, automotive, and construction industries. Because of the high quality and high physical properties of rail steel, new uses are being constantly developed.

• The trend in building codes is toward utilizing the properties of steel in ultimate strength design. It is increasing the demand for rail steel reinforcing bars.

Rail steel bars were specified exclusively in the erection of Executive House, a 40 story apartment in Chicago. Except for column ties and beam stirrups, it was designed for straight bars. Rail steel of 110,000 psi ultimate strength was used throughout. Originally, the structure had been planned with a structural steel frame, but when the design was completed, it was found that construction would be held up a year by structural shape deliveries. The delay led to a change in design to reinforced concrete.

The Rail Steel Bar Association points out that high tensile strength and toughness are basic characteristics of rail steel. It's claimed that the quality of rail steel makes it possible to do a reinforcing job with only four-fifths as much steel needed when intermediate grade steel is used. Result: Reduction in costs without sacrificing strength and durability. Guaranteed minimum yield point is 60,000 psi and actual tensile strength ranges 100,000 to 130,000 psi.

• One important producer states his product mix is not what it used to be.

The company says foreign competition and technological advances in coal mining (particularly haulage), have practically killed the light rerolled rail business (production in 1950 was 41,061 net tons, and in 1959 it was only 2414 tons). The company has virtually abandoned efforts to participate in the metal furniture field and says it was never much of a factor in supplying the agricultural implement industry. Today, it is relying almost entirely on construction as an outlet for its products, including steel posts.

• Still another producer reports his production of rail steel has been diminishing steadily for several years and anticipates it will shortly discontinue production.

A third maker states he has not been actively engaged in the rail steel business since 1957. In neither case is an explanation offered for withdrawal from the field.

Despite what seems to be contraction within this old industry (one active producer has been in business since 1858), Mr. Jacobs points out that the rail steel bar business has never been a static industry.

Industry promotion in research and development continues to be pressed agressively. Various projects are underway, and others are being considered in association with leading universities and colleges. Technical research in the use of rail steel products is being pressed by the industry's trade association.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 146

Demand for steel products used in building and construction is picking up a little, but no general improvement in the order pattern is noticeable. Reinforcing steel is moving fairly well as construction activities rise seasonally, but supplies are adequate, and competition is severe, particularly from imported steel.

Highway work and other government projects are prominent in the building bar picture. However, industrial and commercial construction projects are taking substantial tonnages.

Steel Bars . . .

Bar Prices, Page 145

Some bar producers can still give shipments against new orders before the end of this month, but July delivery promises are fast becoming the rule. Demand continues spotty.

Cold finished bar mill production is off several points. Converters are operating on well balanced inventories of hot rolled bars and are placing only fill-in orders for delivery in four weeks or less.

In New England, inquiry for bars on small arms account is building up. Several thousand tons are needed for the new M-14 rifle.

Rock Island Arsenal closes June 7 on 140 tons of hot rolled, round, 2 in. alloy bars required for gun barrels.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 146 & 147

With the third quarter only three weeks off, most sheetmakers are booking orders for July delivery. In general, though, there has been no pickup in order volume, and most producers expect no strong upturn for at least another month.

Automotive orders are picking up a bit, but other consuming lines are still limiting their purchases. At one medium sized mill in the Pittsburgh area, orders are still declining, and many customers continue to request deferred delivery of both hot rolled and cold rolled. There have been substantial cutbacks and cancellations from appliance makers whose distribution channels are reported overloaded with unsold finished goods.

At another area mill, the decline in bookings was arrested about May 10. Since that time, the company has been operating in the black, with new orders running ahead of cancellations. Automakers are coming into the market with their first big orders for 1961 model runs. But tonnage being booked now won't be shipped until late July or early August. Although sheet producers have good order books for June, they're beating the bushes for July tonnage.

May shipments at several mills were as high as those in April, roughly about 85 per cent of capacity. June shipments will be lower since they'll follow the trend of May's declining orders. By one estimate, June shipments of flat rolled will be equal to 75 per cent of capacity. July shipments probably won't exceed 60 per cent.

Galvanized sheetmakers have sold most of their tonnage for June, but they'll have plenty of openings in July schedules. Consumers are paring their inventories

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MICROROLD STAINLESS STEEL is regularly carried in stock by many of these independent steel warehouses. Washington Steel is a producer of stainless sheet and strip exclusively, all of which is precision rolled on Sendzimir mills.

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to the bone, so it's apparent that the mills will have to increase their stockpiles of finished material. They'll build their inventories in late July or early August, when operations would otherwise falter for lack of new orders.

In silicon sheets and strip, there are indications of an upturn. Consumers went overboard on stock replenishment after the steel strike, booking so much tonnage that many producers were sold out for months. When business fell short of expectations, they hurriedly backed out of order commitments —deferring or canceling much of the tonnage on order. As users complete their inventory adjustments, they're placing small orders to cover their current requirements.

A Midwest sheetmaker thinks fabricators will soon have to return actively to the market as their inventories already are rapidly being depleted. He thinks the third quarter will be slow, with business picking up toward the end of the period and extending into fourth quarter.

Tin Plate . . .

Tin Plate Prices, Page 147

Shipments of metal cans increased in March to 329,986 tons vs. 287,962 in February, reports the U. S. Census Bureau. The total, however, was down from that in March a year ago when the movement amounted to 341,095 tons. The cumulative total for the first three months this year, 918,774 tons, was down compared with 959,025 in the like 1959 period.

The movement of fruit and fruit juice cans totaled 39,960 tons in the month vs. 43,357 in February. Vegetable and vegetable juice cans amounted to 32,223 vs. 25,907 in the preceding month. The total for those two classifications in March was 72,183 tons vs. 74,739 in the like month a year ago. The cumulative shipment total for the first three months this year was 215,931 tons vs. 217,584 in the like period a year ago.

Beer can shipments in March amounted to 62,691 tons vs. 43,542 in February and 67,376 in March last year. The total for the first three months was 153,958 tons vs. 165,672 in the like 1959 period.

Plates . . .

Plate Prices, Page 145

The decline in plate demand is slowing down. No appreciable pickup over the next several weeks is in sight. Mill operations are slipping and may continue to do so into midsummer. One Eastern plate mill will close down for two weeks for vacations, beginning with the last several days of June.

Pittsburgh area mills say June bookings are running far behind those of May and April. Producers see no possibility of a pickup until late August or early September. The best that can be said for the market is that order cancellations and shipment deferments have tapered off. Because of the weakness in demand from producers of big inch pipe, June shipments of plates probably won't exceed 55 or 60 per cent of producing capacity.

Concrete cylinder pipe has been accepted over welded steel for the 9½ mile, 40 in. diameter Nooksack supply line for Bellingham, Wash.

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This d-c rectifier type welder does more things better than any other welder of its class because —

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These features contribute to the Gold Star SR's greater arc stability, denser welds, easy arc starting and flexibility to handle all electrodes in all positions.

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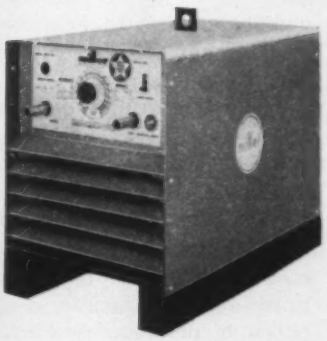

The features that set the SR above and beyond the normal standards of welder performance belong to the SRH also. But, in addition to the horizontal design for easier stacking and paralleling, this welder has an "all-weather" construction that includes baked varnish coated transformers and rectifiers plus phosphatizing and painting of all base and sheet metal — even fan blades. Cam-Lok receptacles are standard equipment. The Gold Star SRH welds real well.

Complete specifications on these Gold Star models will be sent promptly.

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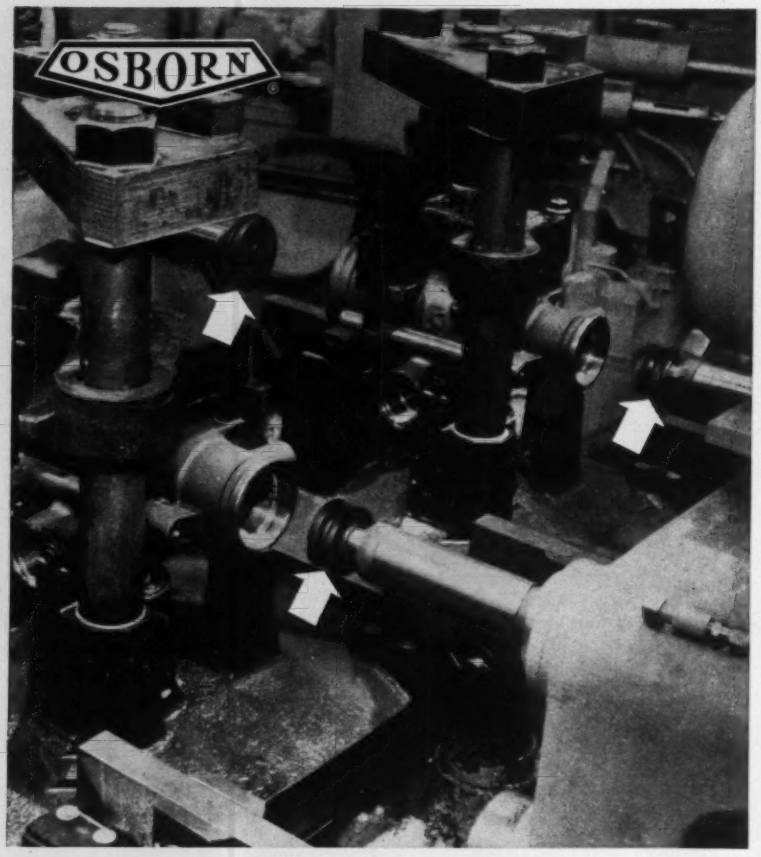

In this automatic twin setup, Osborn TY® brushes are advanced into both ends of a pair of valve housings without surface contact. The drive head oscillates the brushes around the ring groove contours, then retracts . . . all automatically.

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in 5½ seconds with new OSBORN TY® Power Brushes

This large manufacturer of automotive power steering equipment uses Osborn TY® brushes to deburr double internal ring grooves in both ends of these valve housings. Former off-hand methods required lots of time . . . effort. Still, high quality standards were hard to obtain.

Today deburring is done automatically with Osborn TY brushes . . . in just 5½ seconds. *High quality results are uniform . . . consistent.* These tough, durable TY brushes operate 16 hours a day in a 96-station automatic transfer machine. Even in this rugged service, brush life runs 2½ to 3½ weeks.

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Osborn Brushes

Metal Finishing Machines . . . and Finishing Methods

Power, Paint and Maintenance Brushes • Foundry Production Machinery

Wire . . .

Wire Prices, Pages 147 & 148

Because of the need to balance mill inventories and production schedules with reduced demand for wire products, American Steel & Wire Div., U. S. Steel Corp., plans to shut down the blast furnace, open hearth, and blooming mill departments at its Donora (Pa.) Works before midmonth.

Producers can give shipments of manufacturers' wire within two to three weeks. Merchant products are available from stock.

Southwest Ingot Rate Off Because of Heavy Imports

Declining steelmaking operations in the Southwest are attributed to a continuing high level of imports. April intake at Texas ports totaled 59,326 tons, bringing the total for Texas in the first four months to 259,000 tons.

Belgium and Japan continue to be the leading sources of foreign steel. Of the April total, 33,341 tons came from Belgium, 12,228 tons from Japan. While the April tonnage was down about 24,000 tons from the peak reached in March, domestic steelmen are gloomy over the outlook. They say there is not much chance for competing with foreign mills which are able to deliver steel f.o.b. cars, Houston, at prices $16 to $25 a ton under local mill quotations.

The leading mill at Houston is operating at 67 per cent of capacity. The mill at Lone Star is operating three furnaces, and it's thought the operating rate will be cut more. The Sand Springs, Okla., mill is producing two heats a day, four days a week, and is reported planning a shutdown. At Kansas City, Mo., open hearth furnaces have been shut down, and the mill's rate is estimated at 50 per cent.

A new price sheet, circulated in Houston by a French mill, shows 5 cents per pound increases on angles, channels, rounds, squares, and reinforcing bars. A spokesman for a Belgian mill said $2 a ton increases for a wide range of items will be announced shortly.

Orders for foreign steel are reported increasing. Brokers as well as consumers expect no significant price slashes by the foreign mills.

The viewpoint seems to be spurring demand.

Domestic mills are picking up new orders, but mill stocks are heavy. One mill spokesman says June operations will not be as good as those in May. Declining inventories point to some improvement in operations during the third quarter.

There has been no move by the Houston mill to reduce its price on reinforcing bars in line with a reported reduction of $13.50 a ton by another Texas producer.

Distributors . . .

Prices, Page 151

While over-all business of steel service centers is lighter than had been anticipated earlier this year, a slight pickup is noted in some districts. The improvement is attributed to an increase in construction activity.

The profit margin has been cut in many instances where suppliers of domestically produced items have shaded quotations to meet the competition of importers. Several service center operators, principally on the West Coast, are selling at sacrifice levels.

Pig Iron . . .

Pig Iron Prices, Page 151

Demand for merchant foundry iron continues to decline. The low point for the year is expected to be reached in July, when many foundries will be closed for vacations. Foundries serving the automotive industry are fairly busy, but those making castings for the appliance trade and other users report slow business.

The light demand for foundry iron, combined with less need for hot metal for steelmaking purposes, has resulted in a further slash in blast furnace operations. The Edgar Thomson Works of U. S. Steel Corp., Braddock, Pa., has taken off two stacks during the last week or so and is operating only four out of seven.

Republic Steel Corp. has taken off two blast furnaces during the last two weeks at Cleveland and is operating three out of six. The company also shut down a furnace at its Buffalo mill.

Youngstown Sheet &Tube Co. has cut off two blast furnaces at its

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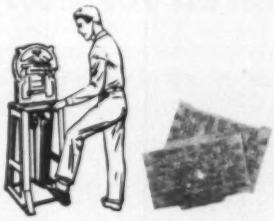
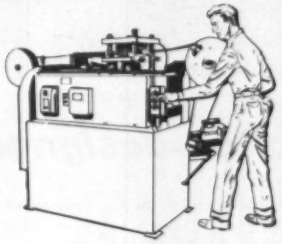


One to four tags at a time (model 344)

Model 344 Pannier Embossing Machine has two uses. It can emboss up to 4 duplicate tags, like that pictured above, in sizes up to 3" x 5½" or longer, at one operation (one letter at a time).

This same machine provides the low cost, matched male and female embossing matrices (shown at left) for use with Model 207. Paired, these two machines provide complete equipment for volume tag production.



Volume Tag Production (No. 207)

The Pannier Master Marker Embossing Machine, Model No. 207-H-6 automatically produces up to 60 duplicate tags per minute, employing coils of Pannier Safety Tag stock. These tags, in strip form, are nicked and notched for easy detachment from the coiled strip. Embossing impression is made by inexpensive male and female metal matrices—that cost only a fraction of type-and-matrix methods. The machine operates by start-stop pushbutton control. Fingers never approach the embossing area.

For single, occasional tags

Pannier engineering provides a wide range of Master Marker Embossing Machines to suit any quantity requirement. This small hand-held Embosser makes individual tags on half-inch strip metals or vinyl plastic.

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Flat roof structures have no such natural accommodation for fixtures, which swoop low overhead, or occupy important floor space. Butler industrial buildings, such as Flick-Reedy's, have the muscle to support heavy cranes and hoists. No need to resort to obtrusive floor cranes, or shore up overhead craneways with bulky, costly reinforcements.

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There's more. Butler offers two new superior curtain wall panels: Butlerib, a handsome, precision formed panel of great strength, and Monopanl, an exclusive factory-insulated panel—both in factory-applied colors. You'll like them. Consult your Butler Builder (in the Yellow Pages), or write direct.

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Campbell (Ohio) Works, leaving only two blast furnaces in operation at that plant.

Shenango Furnace Co. banked one of its two blast furnaces at Sharpsville, Pa.

The strike at the Burlington, N. J., plant of U. S. Pipe & Foundry Co. has ended.

Structural Shapes . . .

Structural Shape Prices, Page 145

Structural steel bookings increased in April for the third straight month, reports the American Institute of Steel Construction. The total was 344,944 tons, 17 per cent above bookings in the corresponding month a year ago and marked a 56 per cent gain over bookings in January, this year.

The total booked in the first four months this year was 1,197,850 tons, up 11 per cent from bookings in the like period of 1959.

Shipments also increased in April, amounting to 286,884 tons. The month's movement was the best since last June and was practically the same as in April last year.

Order backlogs as of Apr. 30 totaled 2,401,225 tons. Of this amount, 1,338,718 tons were scheduled for fabrication during the four months ending Aug. 31.

Fabricators are cuttin„ their steel inventories to a minimum. New business is slow.

Order cancellations and shipment deferments have tapered off, but new orders are still trending downward. Bookings may not improve significantly until late August.

In the absence of a large railroad carbuilding program, standard structurals are in poor demand. June shipments of leading producers won't exceed 55 or 60 per cent of capacity. Wide flange beams are in relatively good demand and will probably be shipped at 70 per cent of capacity in June.

Demand is slightly improved in the East; structural inquiries that had been held up for some time have become active. But awards have not fully checked the decline in order backlogs.

Plain structural material is still available for nearby shipment. Standard shapes can be had in two to three weeks and wide flange beams within three to five weeks.

An increasing number of speci-

(*Please turn to Page* 142)

Shipments of Steel Products—March, 1960

(All grades; net tons)

Products	March, 1960 Shipments			Total for First Three Months	
	Carbon	Alloy	Stainless	1960	1959
Ingots, etc.	28,013	9,775	2,155	132,796	72,769
Blooms, etc.	131,008	54,971	1,629	577,467	430,385
Tube rounds	1,812	1,474	.....	7,054	4,577
Skelp	28,226	.....	.....	57,613	12,409
Wire rods	110,435	3,536	1,146	364,421	341,633
Shapes (heavy)	526,625	9,572	30	1,634,542	1,235,610
Steel piling	37,398	.....	.....	120,836	89,394
Plates	682,411	69,098	3,794	2,251,573	1,718,047
Rails—standard	82,096	.....	.....	259,871	222,656
Rails—other	7,157	.....	.....	16,300	11,252
Joint bars	2,865	.....	.....	8,872	9,448
Tieplates	13,232	.....	.....	44,127	45,716
Track spikes	4,418	.....	.....	13,741	13,909
Wheels	25,402	90	.....	77,483	51,685
Axles	14,142	48	.....	40,142	22,846
Bars—hot rolled	688,098	190,726	3,768	2,603,918	2,104,881
Bars—reinforcing	144,779	.....	.....	469,513	500,500
Bars—cold drawn	142,589	28,031	5,850	514,313	414,775
Tool steel	1,619	8,743	.....	29,619	24,778
Standard pipe	217,676	108	.....	762,420	622,096
Oil country goods	92,726	32,387	.....	490,862	636,911
Line pipe	238,699	24	.....	755,443	755,974
Mech. tubing	64,833	26,774	439	282,569	224,073
Pressure tubing	18,417	4,397	1,460	74,868	75,642
Drawn wire	220,871	4,431	2,719	790,169	725,116
Nails & staples	28,066	.....	1	105,012	103,577
Barbed wire	4,558	.....	.....	13,161	15,605
Woven fence	10,518	.....	.....	33,065	45,662
Bale ties, etc.	3,864	.....	.....	11,499	19,137
Black plate	58,653	.....	.....	175,346	178,752
Tin plate—HD	38,131	.....	.....	100,000	101,612
Tin plate—electro	538,166	.....	.....	1,474,897	1,457,243
Sheets—HR	901,704	38,076	2,615	2,849,461	2,442,180
Sheets—CR	1,587,299	6,197	14,048	4,647,926	4,225,560
Gal. sheets	329,219	176	.....	942,096	872,842
Sheets, other	27,042	.....	.....	79,974	82,788
Elec. sheets	4,990	58,021	.....	206,804	177,554
Strip—HR	161,496	3,204	708	470,381	387,731
Strip—CR	137,762	1,783	16,862	476,813	358,577
Totals (1960)	7,357,015	551,642	57,224	23,966,967	.....
Totals (1959)	7,534,355	515,408	67,925	.....	20,835,902

Data from American Iron & Steel Institute.

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fications on I-beam bridges calls for alternates on prestressed concrete. About 8500 tons for bridges are pending in New England, including some wide flange tonnage. Backlogs of the smaller fabricators are lower, and competition for new business is sharp. The level: 12.00 cents to 12.50 cents per pound on composite beam bridges in place.

Whether structural steel or prestressed concrete will be used in the Yakima Avenue bridge will be decided shortly by Tacoma (Wash.) city authorities. The project involves 600 tons of shapes and 360 tons of reinforcing bars. Bids were opened May 11 and have since been under consideration. Woodworth & Co., Tacoma, offered the low structural bid, $937,933, while Peter Kiewit Sons Co., Vancouver, Wash., entered a low bid of $964,265 for prestressed concrete.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1229 tons, state bridgework, FALIE 60-1, Nassau and Suffolk counties, New York, through Zare Contracting Co., to Phoenix Bridge & Iron Works, Phoenixville, Pa.

310 tons, 12 story office building, New York, through Masonry Reconstruction Co., general contractor, to Lafayette Iron Works, Jersey City, N. J.

300 tons, addition to Physicians' Hospital, Portland, Oreg., to unstated structural fabricator.

100 tons or more, butterfly valves for Cougar Dam project, Oregon, to Willamette Iron & Steel Co., Portland, Oreg., low bidder at $103,782 to the U. S. Engineer, Portland.

STRUCTURAL STEEL PENDING

10,885 tons, cable anchorage metalwork, Narrows Bridge, New York, bids to be opened by the Triborough Bridge & Tunnel Authority June 15.

8000 tons, missile complex facilities, U. S. Army Engineers, Plattsburg, N. Y., bids June 12.

6800 tons, bus terminal, 41st St. and 8th Ave., New York, for the Port Authority of New York, Starrett Bros. & Eken Inc., general contractor.

4000 tons, additional terminal facilities, LaGuardia Airport, Queens, New York, bids June 8; Turner Construction Co., New York, general contractor.

3900 tons, George Washington Bridge bus terminal, New York, Port Authority of New York; Bethlehem Steel Co., Bethlehem, Pa., low bidder.

2000 tons, overflow section, Dardanelle lock and dam, Little Rock, Ark., Al Johnson Construction Co. and Peter Kiewit Sons Co., Chicago, general contractors.

1500 tons, office building, lower Manhattan, New York, for Chemical Bank-New York Trust Co., George A. Fuller Co., New York, general contractor.

1000 tons, building, Garden State Paper Co., Garfield, N. J., Joseph L. Muscarelle, low bidder on the general contract.

950 tons, Montana State, Yellowstone River 937 ft dual bridges; W. R. Cahoon Construction Co., Pocatello, Idaho, low bidder at $808,983.

683 tons, state bridge project, Contract 180, Harrison and Jefferson counties, Ohio; bids closed.

600 tons, classroom building, Portland, Oreg. college; bids in.

258 tons, state bridgework, FARC 60-62, Erie County, New York, Bero Construction Co., Waterloo, N. Y., low on the general contract.

250 tons, city bridge with access road and ramp, Yonkers, N. Y., Horn Construction Co., Merrick, Long Island, N. Y., low on the general contract.

200 tons or more, three portable, 70 ton spillway gates, panels, etc., McNary Dam, Columbia River; bids to the U. S. Engineer, Portland, Oreg., June 21.

150 tons, control tower, LaGuardia Airport, Queens, New York; bids closed.

Unstated, five-story Providence Hospital, Anchorage, Alaska; bid date advanced to June 7.

REINFORCING BARS . . .

REINFORCING BARS PLACED

3248 tons, grade C, 40 ft lengths, U. S. Engineer, San Francisco, to the Southwest Steel Rolling Mills, Los Angeles.

350 tons, Washington State highway bridge, Pierce County, to Northwest Steel Rolling Mills Inc., Seattle; A. R. Anderson Co., Seattle, general contractor on a bid of $359,771.

300 tons, Hills Creek Dam, Oregon, to Far West Steel Co., Eugene, Oreg.; Green Construction Co., Seattle, and Tecon Corp., Dallas, joint contractors at $1,191,912.

160 tons, Bureau of Reclamation project, Othello, Wash., to Columbia Basin Steel & Iron Co., Pasco, Wash.

REINFORCING BARS PENDING

500 tons, addition to Washington State Hospital, Sedro-Woolley; Patti-MacDonald Co., Seattle, low base bid of $1,482,000.

430 tons, two, 6 story women's residence halls, Washington State College, Pullman, Wash.; Johnson-Busboom-Rauh, Spokane, Wash., low at $1,799,825.

150 tons, addition to Washington Medical Lake Hospital; Johnson-Busboom-Rauh, Spokane, Wash., low bidder at $384,690.

Unstated, physics building, Oregon State College, Corvallis, Oreg.; bids to Board of Education, Portland, Oreg., June 3.

100 tons or more, eight Montana highway passes, total length 1011 ft; Montana Engineering & Construction Co., Helena, Mont., low at $361,363.

Unstated, two bridges, Tongass Highway, Alaska; S. S. Mullen Inc., Seattle, low at $1,038,242 to the Bureau of Public Roads.

Unstated, Queets River bridge, Olympic National Park, Washington State; general contract to Workman Construction Co., Canby, Oreg., low at $64,206 to the Bureau of Public Roads, Portland, Oreg.

PLATES . . .

PLATES PLACED

973 tons, hull, General Stores Supply Office, Navy, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.; also floor plate at $39,831.

235 tons, hull, General Stores Supply Office, Navy, Philadelphia, to Columbia-Geneva Div., U. S. Steel Corp., Pittsburgh; also 124 tons, carbon steel sheets, to Enterprise Galvanizing Co., Philadelphia.

220 tons, hull, General Stores Supply Office, Navy, Philadelphia, to the Caine Steel Co., Chicago.

175 tons, two tanks, Cities Service Oil Co., Linden, N. J., to Graver Tank & Mfg. Co. Inc., East Chicago, Ind.

150 tons, 9½ miles of 40 in. concrete cylinder supply pipe for Nooksack project, Bellingham, Wash.; general contract to C. V. Wilder Co., Bellingham, Wash.; subcontract for pipe to United Concrete Pipe Corp., Auburn, Wash.

PLATES PENDING

Unstated, water intake structures; bids to Longview, Wash., June 9; Stevens & Thompson, Seattle, engineer.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Seaboard Airline, ten diesel-electric locomotives to Alco Products Inc., Schenectady, N. Y. They will be 1800 hp road switcher type.

RAILROAD CARS PLACED

Chicago, Rock Island & Pacific, 550 boxcars, to American Car & Foundry Div., ACF Industries, New York.

RAILROAD CARS PENDING

Chicago, Milwaukee, St. Paul & Pacific, 40 doubledeck passenger cars for suburban service.

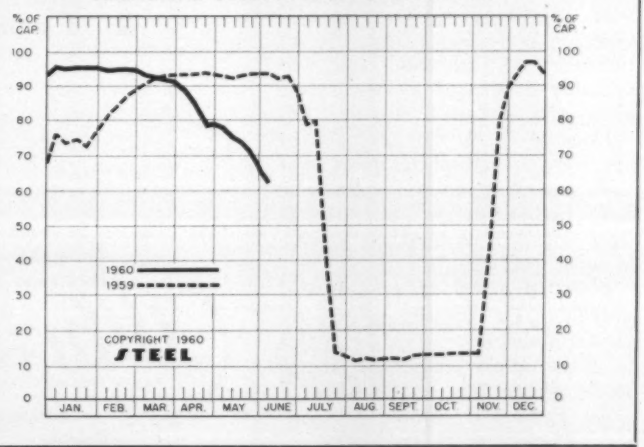
DISTRICT INGOT RATES

(Percentage of capacity utilized)

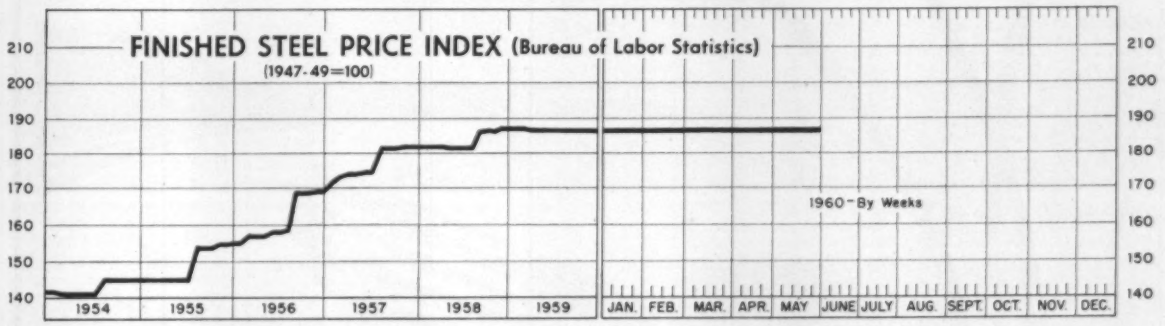
	Week Ended June 5	Week Ago	Month Ago	Year Ago
Northeastern	68	72	81	94
Buffalo	65	73	78	98
Pittsburgh	62	70	76	96
Youngstown	27	40	52	91
Cleveland	71	69	74	94
Detroit	82	72	97	97
Chicago	69	72	76	93
Cincinnati	63	52	84	84
St. Louis	82	79	88	103
Southern	53	54	77	91
Western	63	67	73	93
Total Industry	61.9	65.6	75.0	93.7
Index (1947-49=100)	109.9	116.4	133.0	165.2
Net Tons (In thousands)	1,765	1,870	2,137	2,653

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



May 31, 1960	Week Ago	Month Ago	May Index	Year Ago
186.8	186.8	186.8	186.8	186.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 31

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.766
		Woven Wire Fence (20-rod roll)	21.880

STEEL's FINISHED PRICE INDEX*

	June 1 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$118.45
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	32.00	33.33	33.33	34.00	34.67

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	June 1 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, 7/32-9/16" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton

	June 1 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$30.50	$33.50	$33.50	$34.50	$34.50
No. 1 Heavy Melt, E. Pa.	35.00	35.00	35.00	36.00	35.50
No. 1 Heavy Melt, Chicago	30.50	31.50	31.50	34.50	34.00
No. 1 Heavy Melt, Valley	32.50	32.50	35.50	39.50	34.50
No. 1 Heavy Melt, Cleve.	31.50	31.50	32.50	36.50	31.50
No. 1 Heavy Melt, Buffalo	30.50	30.50	30.50	33.50	29.50
Rails, Rerolling, Chicago	52.50	52.50	52.50	58.50	51.50
No. 1 Cast, Chicago	42.50	42.50	42.50	49.50	40.50

COKE, Net Ton

Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25

NEW SUPER STAINLESS STEELS SHED CORROSION

PH55A and PH55B are the new super stainless steel alloys developed by Cooper Alloy Corp. to resist those corrosion-erosion, corrosion-abrasion attacks which cannot be handled by most extisting alloys.

These alloys have high strength and high hardness even at temperatures elevated to 1000°F-1400°F. PH55A is particularly recommended for applications where pitting corrosion is the problem. PH55B, more ductile, is suited for applications where corrosion resistant parts are subject to stress and shock. Write today for Form PH55.

COOPER ALLOY

Corporation • Hillside, New Jersey

Steel Prices

Mill prices as reported to STEEL, June 1, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 146, footnotes, page 148.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....80.00
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 .....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14.119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1 5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
Los Angeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1.8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ...8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ...6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 .....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1...8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2...7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.80
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3...6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2...5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'e'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 ..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
Kansas City,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburg J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 .....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 .....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (Including loaded extra)
Carbon
LosAngeles P2, S30 ..11.75*
Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 .....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ...7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025

Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers O. Y1 .....5.675
Tonawanda,N. Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N. Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(Direct Rolled)B14 13.55
Economy(Staybolt)B14 ,19.80
McK.Rks.(S.R.) L5 ....14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 .....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (16 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 .....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(38) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14..7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(38) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 ....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapmann&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3 .8.325
SparrowsPoint,Md. B2 .7.575
Warren O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 .....7.425
Detroit D2, M1, P20 .7.425
Dover O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10.7.875
NewBritain Conn. S15..7.875
NewCastle,Pa. B4, M22.7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M22	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55
Spring Steel (Tempered)			**0.80C**	**1.05C**	**1.35C**
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M22 ..7.425*
Riverdale,Ill. A1 .....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester Mass. A7 ...7.975
Youngstown S41, Y1..7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irwin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	....	7.90	....	....
Niles,O R2 (20-27 Ga.)	....	7.90	8.10	8.30

TIN PLATE,Hot Dipped 1.25 Common Coke	1.50 lb	1.75 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary Ind. U5	8.20
GraniteCity G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	....	9.975*11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	....	9.875*11.20*	11.90*	13.05*	....
Mansfield,O. E6	....	9.875*11.70	12.40	13.55	14.65
Newport,Ky. A2	....	9.875 11.70*	12.40*	13.55*	14.65*
Niles,O. M21	....	9.875*11.70	12.40	13.55	....
Vandergrift,Pa. U5	....	9.875*11.70	12.40	13.55	14.65
Warren,O. R2	....	9.875*11.70	12.40	13.55	14.65
Zanesville,O. A10	....	.... 11.70†	12.40	13.55	14.65

	Stator
Vantergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	..	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed, †Fully processed only, ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ....8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 .8.10
Sterling,Ill. (1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....13.40
KansasCity,Mo. U3 ...12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ....12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.05
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 ....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 ....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 ....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ...17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria O. S1 .....13.45
KansasCity,Mo. U3 ....13.70
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St. Louis L8 .....13.45
SparrowsPt.,Md. B2 ..13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
Franklin Park,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	173
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190‖
Atlanta A11	198‖
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‖
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‖
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198‖
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa. 9-11½ga. J5	190‖
Atlanta A11	192‖
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190‖
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala. R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65‖
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75‖
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

Wire, Merchant Quality (6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325‖
Atlanta(48)A11	9.10	9.775‖
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675‖
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625‖
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35‖
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775‖
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65†
Worcester,Mass. A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. ‖10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws: ¾ in. and smaller, 6 in. and shorter:

Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread: Through 1 in. diam, 6 in. and shorter:

Packages	+ 5
Bulk	+19

Through 1 in. diam., longer than 6 in.:

Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in., larger 12.85 ⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1⅛		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling—Ingot	Rerolling—Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.06	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

ANOTHER NORTON PRODUCT

the New VIZI-DISC

lets you see your work while you grind. It cuts cooler and gives you pin-point accuracy

The unique shape of the METALITE VIZI-DISC gives it "see-through" like a fan blade or an airplane propeller. The operator can see right through the work area of the disc. Obviously, the intermittent action means cooler operation. Get a free demonstration of VIZI-DISC. Just call your Behr-Manning representative or write Dept. S-6, BEHR-MANNING CO., TROY, N. Y., A DIVISION OF NORTON COMPANY.

BEAR BRAND Coated Abrasives

Here is the VIZI-DISC mounted on a portable electric grinder, ready to run. Note the unique shape with parallel sides.

As the grinder starts, note the spinning pattern, similar to an airplane propeller or the blade of an electric fan.

Full rpm. With the VIZI-DISC there is no blind spot. You see your work while you work, as the grinder gets revved up.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.90
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.45
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	66.00	66.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$73.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max).	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.53	8.66	10.06	....	10.94	9.33	11.80	16.38	9.92	9.15	10.50
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.90
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	8.74	10.20	10.95	53.00	10.40	8.84	10.65	15.95	9.33	8.67	10.46
Cincinnati	8.91	10.26	11.00	53.43	10.72	9.16	11.53	16.27	9.89	9.05	10.79
Cleveland	8.73	9.88	11.14	52.33	10.51	8.96	11.25	16.06	9.75	8.92	10.56
Dallas	9.62	10.43	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.02
Detroit	9.00	10.46	11.30	56.50	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.62	9.69	11.83
Houston	9.22	10.03	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.62
Indianapolis	9.18	10.64	11.39	....	10.84	9.28	11.09	16.39	9.77	9.11	10.90
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	57.60	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
New York	9.36	10.13	11.35	53.08	11.46	9.74	13.25	16.40	10.20	9.51	11.06
Philadelphia	9.10	10.00	10.89	52.17	11.10	9.50	11.95	16.38	9.85	9.55	10.55
Pittsburgh	8.73	9.88	11.03	52.33	10.49	8.85	11.25	15.95	9.36	8.68	10.32
St. Louis	8.84	10.58	11.33	....	10.50	8.95	11.28	16.33	9.45	8.78	10.57
St. Paul	9.00	9.59	10.74	....	10.66	9.12	11.49	16.54	9.63	8.95	10.49
San Francisco	10.17	11.69	11.45	55.10	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.07	11.44	12.05	56.52	11.84	9.96	16.20	17.80	10.59	10.17	12.46
Spokane, Wash.	9.97	11.34	11.95	57.38	11.74	9.86	16.20	17.80	10.49	10.07	12.36

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, ¾ in.—2½ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅝ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, ¼ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, Concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian, 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe.	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	35.10-50.10†
Bronze, 5000-lb lots	53.10-56.70†
Copper, electrolytic	15.00*
Copper, reduced	15.00*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	60.70-69.00†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	46.50-64.50
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	21.20-34.40‡
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom.**
Chromium electrolytic 99.8% Cr, min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	$5.65	$5.65	$5.50	$5.85
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.65	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	6.00	5.90	5.90	5.75	6.10
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.60	9.65	9.50	9.40	9.75
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.25	6.15	6.15	6.00	6.35
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.40	6.30	6.25	6.60
Wire Rods, O. H., No. 5	6.75	6.75	6.65	6.60	6.95
Bright Common Wire Nails (§)	8.50	7.40	7.40	7.25	7.65

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

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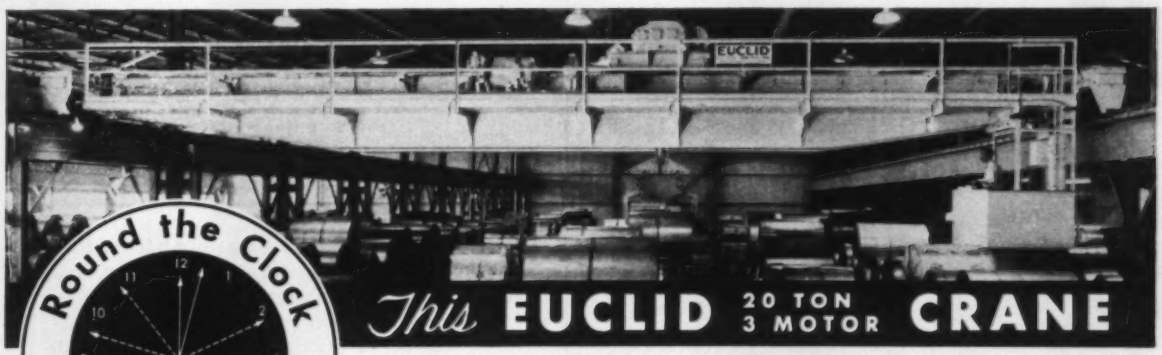

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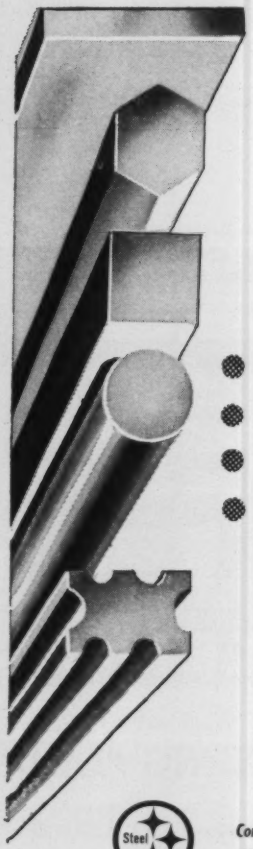

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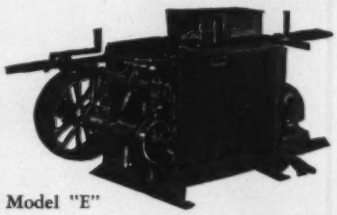

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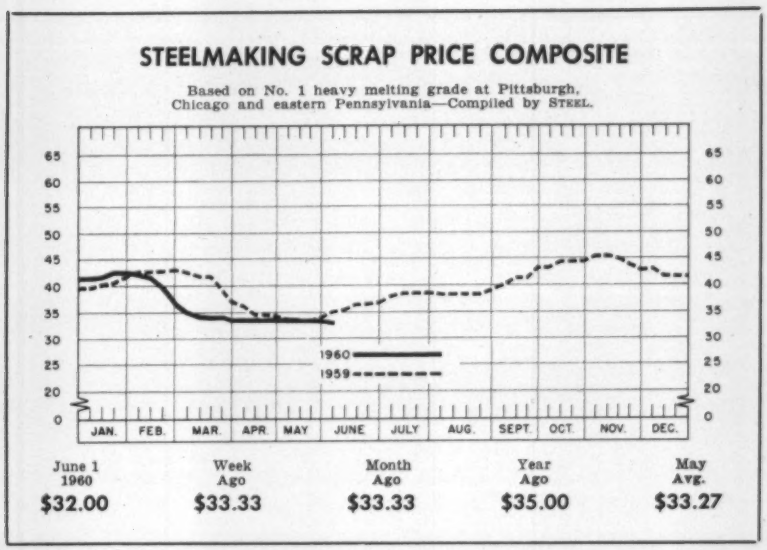


Scrap Price Index Resumes Decline

STEEL's composite on No. 1 heavy melting steel falls to $32, lowest point since May, 1958. Virtual halt in domestic demand reflects sagging steelmaking operations

Scrap Prices, Page 156

• **Pittsburgh**—Prices are weakening as steelmaking operations decline. GM's Fisher Body Div. sold No. 1 factory bundles to brokers at $34.75, f.o.b. plant vs. $37.25 a month ago. Brokers for a mill on the edge of the district paid $31 for No. 1 heavy melting and $26 for No. 2 heavy melting. Both prices were off $3, but it's understood that the tonnages purchased were about half the usual size. A local consumer bought 1000 tons of No. 2 bundles at $25.

• **Chicago**—Prices here have to be based on what buyers would be willing to pay—if they were buying and on what brokers would be willing to sell—if they were selling.

Operating rates at the steel mills are continuing downward. The mills already have big inventories of scrap and are not buying additional tonnage.

Two key grades, No. 1 heavy melting and No. 1 factory bundles, have dropped $1 a ton, but prices are nominal. Also, a recent sale of railroad axles reflected the declining market.

Sales of industrial bundles by auto stamping plants in the area just before the Memorial Day holiday brought bids of $32.40 to $32.70, f.o.b., plants, down about $2 a ton from a month ago.

• **Philadelphia** — Domestic demand for scrap continues slow, but prices on all the steel grades are unchanged. Heavy breakable cast is off $1 to $42, delivered. Export business is holding up well and is exerting a steadying influence.

• **New York**—Broker's buying prices are unchanged throughout the list. Domestic trading is negligible. Were it not for good export demand, trading would be at a standstill.

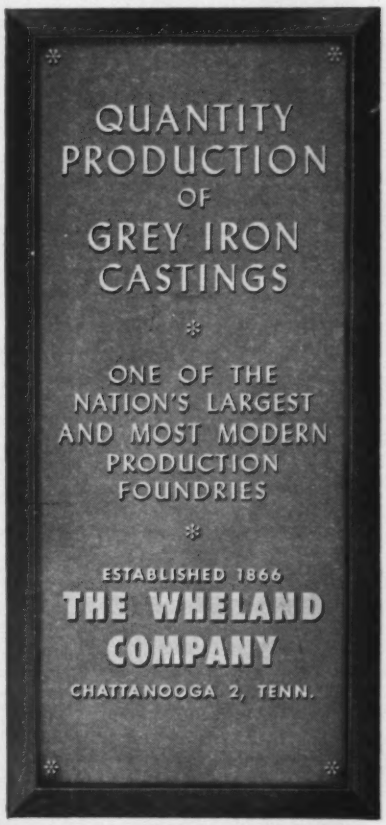
• **Cleveland**—Trading is extremely limited in this market, and quoted prices are largely nominal, pending representative sales. No. 1 heavy melting is quoted $31-$32 here, but brokers say a substantial buy probably could be made below that level. The outlook is for June orders to be placed in the Valley at around $32-$33 for No. 1 heavy melting. Steelmaking operations in the Cleveland area rose 2 points to 71 per cent of capacity last week, but the ingot rate fell 13 points to 27 per cent in Youngstown.

• **Detroit**—The market is quiet, but prices are unchanged despite the absence of buying. No early upturn is expected.

• **Buffalo**—Dealers expect June orders to be placed at prevailing levels. There may be a slight decline in the price of the No. 1 grades, but indications are that prices on the secondary grades will hold. There's plenty of scrap in the area in relation to current mill needs. Some of it is being exported. Only one boatload has come down the lakes from the Detroit auto plants so far this year. Ordinarily, a heavy movement of scrap from the Detroit auto plants is taken by the Buffalo steel mills.

• **Cincinnati**—Prices are off $2 a ton in dealer quotations on the principal grades of steelmaking scrap, based on limited tonnage sales to a local mill for June delivery. No. 1

(*Please turn to Page* 161)



Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, June 1, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

June 1	$32.00
May 25	33.33
May Avg.	33.07
June 1959	36.07
June 1955	35.44

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 dealer bundles	*31.00-32.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*30.00-31.00*
No. 1 factory bundles	*36.00-37.00*
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut structurals:	
2 ft and under	39.00-40.00
3 ft and under	38.00-39.00
Heavy turnings	30.00-31.00
Punchings & plate scrap	42.00-43.00
Electric furnace bundles	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 2 ft and under	*55.00-56.00*
Rails, 18 in. and under	*56.00-57.00*
Random rails	*49.00-50.00*
Angles, splice bars	45.00-46.00
Railroad specialties	47.00-48.00
Rails, rerolling	*59.00-60.00*

Stainless Steel Scrap

18-8 bundles & solids	200.00-205.00†
18-8 turnings	100.00-105.00†
430 bundles & solids	100.00-105.00†
430 turnings	50.00-55.00†

CHICAGO

No. 1 hvy melt., indus.	*31.00-32.00*
No. 1 hvy melt., dealer	*29.00-30.00*
No. 2 hvy melting	*26.00-27.00*
No. 1 factory bundles	*34.00-35.00*
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	*18.00-20.00*
No. 1 busheling, indus.	*31.00-32.00*
No. 1 busheling, dealer	*29.00-30.00*
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*16.00-17.00*
Shovel turnings	*16.00-17.00*
Cast iron borings	*16.00-17.00*
Cut structurals, 3 ft	*35.00-36.00*
Punchings & plate scrap	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	37.00-38.00
Unstripped motor blocks	35.00-36.00
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
R.R. malleable	48.00-49.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	41.00-42.00
Axles	*50.00-51.00*
Rails, rerolling	52.00-53.00

Stainless Steel Scrap

18-8 bundles, solids	195.00-200.00
18-8 turnings	100.00-105.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	14.00-15.00
No. 1 bundles	28.00-29.00
No. 2 bundles	12.50-13.50
No. 1 busheling	*24.00-25.00*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Heavy breakable	30.00-31.00
Unstripped motor blocks	22.00-23.00
Charging box cast	30.00-31.00
Clean auto cast	43.00-44.00

CLEVELAND

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	23.00-24.00
No. 1 factory bundles	34.00-35.00
No. 1 bundles	31.00-32.00
No. 2 bundles	*17.00-18.00*
No. 1 busheling	31.00-32.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	32.00-33.00
Cut structurals, plate 2 ft and under	39.00-40.00
Low phos. punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Brake shoes	35.00-36.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	49.00-50.00
Rails, 2 ft and under	54.00-55.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	47.00-48.00
Cast steel	40.00-41.00
No. 1 railroad cast	50.00-51.00
Railroad specialties	45.00-46.00
Angles, splice bars	45.00-46.00
Rails, rerolling	56.00-57.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	185.00-190.00
18-8 turnings	85.00-90.00
430 clips, bundles, solids	90.00-95.00
430 turnings	20.00-30.00

YOUNGSTOWN

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 busheling	33.00-34.00
No. 1 bundles	33.00-34.00
No. 2 bundles	*20.00-21.00*
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

BUFFALO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	30.00-31.00
No. 2 bundles	22.00-23.00
No. 1 busheling	30.00-31.00
Shovel turnings	19.00-20.00
Machine shop turnings	14.00-15.00
Cast iron borings	17.00-18.00
Low phos. structurals and plate, 2 ft and under	41.00-42.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-43.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	50.00-51.00
Railroad specialties	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*26.50-27.50*
No. 2 heavy melting	*22.50-23.50*
No. 1 bundles	*26.50-27.50*
No. 2 bundles	*18.50-19.50*
No. 1 busheling	*26.50-27.50*
Machine shop turnings	*10.00-11.00*
Mixed borings, turnings	*10.00-11.00*
Shovel turnings	*12.00-13.00*
Cast iron borings	*12.00-13.00*
Low phos. 18 in.	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	*37.00-38.00*
Heavy breakable cast	*32.00-33.00*
Charging box cast	*36.00-37.00*
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*31.00-32.00*
Rails, 18 in. and under	*52.00-53.00*
Rails, random lengths	*45.00-46.00*

PHILADELPHIA

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00
No. 1 bundles	37.00
No. 2 bundles	21.00
No. 1 busheling	37.00
Electric furnace bundles	38.00
Mixed borings, turnings	17.00†
Shovel turnings	21.00†
Machine shop turnings	17.00†
Heavy turnings	29.00‡
Structurals & plates	38.00-40.00
Couplers, springs, wheels	44.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	*42.00*
Drop broken machinery	51.00-52.00
Malleable	53.00-54.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	30.00-34.00

Stainless Steel

18-8 sheets, clips, solids	180.00-185.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	25.00-26.00
No. 1 busheling	25.00-26.00
Machine shop turnings	6.00-7.00
Shovel turnings	10.00-11.00
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	28.00-29.00
No. 2 bundles	18.00-19.00
No. 1 busheling	34.00-35.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	21.00-22.00
Bar crops and plate	38.00-39.00
Structurals & plate	37.00-38.00
Electric furnace bundles	34.00-35.00
Electric furnace: 3 ft and under	33.00-34.00
2 ft and under	33.00-34.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Stove plate	49.00-50.00
Unstripped motor blocks	38.00-39.00
No. 1 wheels	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	40.00-41.00
Angles, splice bars	40.00-41.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00†
No. 2 heavy melting	28.00†
No. 1 bundles	33.00†
No. 2 bundles	19.00†
No. 1 busheling	33.00†
Machine shop turnings	*11.00†*
Shovel turnings	*13.00†*

Cast Iron Grades

No. 1 cupola	45.00†
Charging box cast	37.00†
Heavy breakable cast	35.00†
Unstripped motor blocks	35.00†
Clean auto cast	47.00†
Stove plate	39.00†

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†
Rails, random lengths	40.00†
Rails, rerolling	50.00†
Rails, 18 in. and under	43.00†
Angles, splice bars	41.00†

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 2 bundles	19.00
Machine shop turnings	13.00-13.50
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	27.00†
Foundry malleable	31.00†
Unstripped motor blocks	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00
No. 2 bundles	17.00
Machine shop turnings	15.00
Shovel turnings	15.00
Cast iron borings	16.00
Cut structurals and plate 1 ft and under	43.00

Cast Iron Grades

No. 1 cupola	*40.00-42.00*

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 1 bundles	29.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	31.00
Unstripped motor blocks	25.00
Stove plate (f.o.b. plant)	21.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 2 bundles	23.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Electric furnace No. 1	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	31.00
Unstripped motor blocks	25.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	20.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	*23.25*
Shovel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	*43.00*

†Nominal.
‡F.o.b. Hamilton, Ont.

Clean, sanitize, and Jenolize without fumes, flame, or excess water . . .

New All-Electric Hypressure Jenny!

Anywhere that flame, fumes, or excess water are objectionable or hazardous, the new Model E-350 All-Electric Jenny® will solve the cleaning or sanitizing problem. And with the new Jenolizing Process, machinery, equipment, and parts are left with a coating that protects against flash rusting, and gives a glossy, like-new appearance to painted surfaces.

Model E-350 combines the right amounts of heat, pressure, and cleaning solution to handle the majority of cleaning jobs at savings of up to 80% in time and labor costs. Its compact size, portability, low water output, and quiet operation without flame, smoke, or fuel fumes, make it ideal for use practically anywhere in the plant.

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Perfect for

manufacturing plants, food processors, textile mills, chemical and pharmaceutical plants, metal working and fabricating, petroleum industry, canneries, hotels and institutions, and every other operation where fumes, smoke, excess water are objectionable.

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HOMESTEAD VALVE MANUFACTURING COMPANY
Hypressure Jenny Division, P. O. Box 98, Coraopolis, Pa.

Prices Firm for Now

You can look for nonferrous prices to be unusually stable over the summer. By yearend, copper may be down, lead and zinc up. Aluminum may hold

Nonferrous Metal Prices, Pages 160 & 161

NONFERROUS prices will be stable throughout the summer. You can look for a continuation of discounting in some fabricated and semifabricated product lines, but prices for such primary forms as pig, ingot, cake, billet, slab, and wire bars shouldn't vary much from present levels.

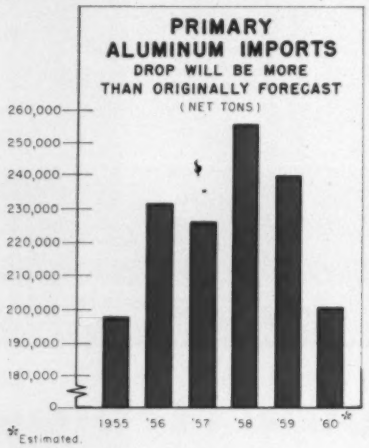
Only a severe polltical-economic crisis in some large consuming or producing area of the Free World could change the outlook.

• **Copper Holds**—The much forecast drop in copper prices probably won't come for some time. Today's market wears a bold front but a shaky foundation. Primary producers and custom smelters are sold out through June, thanks to a fair U. S. market and good sales to European customers. Some firms expect to sell all their output in July, but the industry as a whole will feel the traditional midsummer sales pinch then.

Hovering in the background is the specter of overproduction. Free world mining and processing facilities are geared to a high enough operating rate to glut the Free World market with metal and probably result in operational cutbacks and price weakness later in the year—that is, if the bulk of them continue uninterrupted.

The recent ending of strikes at Anaconda Co. properties in Chile make the possibility of overproduction difficulties by fall more likely. But forecasts can be upset by the potentially explosive situation in Africa.

The short term outlook seems to shape up like this: Sales will slack off in the summer. Some major customers like brass mills won't feel much of a sales upturn until fall. Customers and customers of customers are still working off inventory. Custom smelter prices could conceivably go down in late summer. The primary price probably wouldn't follow right away.



• **Lead Sales Still Good**—No sign of a letdown has appeared in this industry. Production is fairly well in balance with consumption in the U. S., but worldwide there is some overproduction (in spite of voluntary curtailments outside the U. S.). Prices won't move much, if any, during the summer.

• **Zinc Only Fair**—Zinc sales continue at a slower rate than consumption as customers work off inventories. Some producers expect a pickup later in the summer; others don't see much improvement until fall. Prices shouldn't change over the summer.

Both lead and zinc people will still enjoy a better year than 1959.

• **Glamor Metals to Soar** — The specialty metals (zirconium, hafnium, columbium, tantalum, tungsten, molybdenum, beryllium, uranium) will show the greatest percentage growth of all metals in the '60s, predicts Dr. Frank H. Driggs, president of Fansteel Metallurgical Corp.

• **More Aluminum**—Aluminum Co. of America last week started the first potline at its $80 million reduction plant at Warrick, Ind. Output is at the rate of 35,000 tons a year, most of which will go to the General Motors Corp.'s Central Foundry Div. plant at Bedford, Ind.,

• **Aluminum Hike Unlikely**—Aluminum producers frankly admit sales have been disappointing. While 1960 is still expected to shade 1959, the competitive scramble for the sales dollar is strong enough to make a price hike highly unlikely in the next few months. Aluminum Co. of America's president, Frank L. Magee, puts it this way: "The current excess production capacity and oversupply of metal have resulted in unusually intense competition in the U. S. aluminum industry, and, for the present, a generally unfavorable price structure from the standpoint of profits, particularly for the semifabricated and mill products."

NONFERROUS PRICE RECORD

	June 1 Price	Last Change	Previous Price	May Avg	Apr. Avg	June, 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	24.700
Copper	33.00	Mar. 10, 1960	33.00–35.00	33.000	33.000	31.490
Lead	11.80	Dec. 21, 1959	12.30	11.800	11.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	100.25	June 1, 1960	100.375	99.570	99.260	104.284
Zinc	13.00	Jan. 8, 1960	12.50	13.000	13.000	11.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

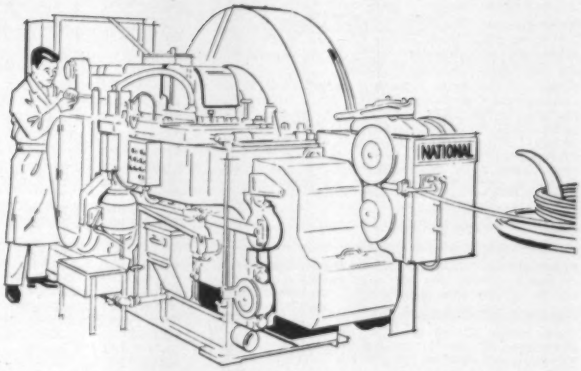
MADE FROM WIRE!

BOLTMAKERS make these interesting parts, and countless others, every day from wire.

Operations include cutting off, extruding, heading, trimming, pointing and thread-rolling.

It's just possible *your* metal parts can be made faster, stronger and at lower cost in Boltmakers (or in other types of Nationals).

May we help you investigate?



NATIONAL 1/2-INCH BOLTMAKER
4,200 PARTS PER HOUR!

Founded 1874—DESIGNERS and BUILDERS of MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS CO-PIONEERS WITH INDUSTRY OF ADVANCED METALWORKING PRODUCTION METHODS

NATIONAL MACHINERY CO.

TIFFIN, OHIO, U. S. A.

HARTFORD **DETROIT** **CHICAGO**

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First rpduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb f.o.b. Minneapolis; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $213-215 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 100.25; prompt, 100.125.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.50; special high grade, 14.75 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.00-28.00; No. 12 foundry alloy (No. 2 grade), 23.75-25.00; 5% silicon alloy, 0.60 Cu max., 25.25-25.50; 13 alloy, 0.60 Cu max., 25.25-25.50; 195 alloy, 27.25-28.25; 108 alloy, 24.25-25.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 23.75; grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft

Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 20.00-20.50; light copper, 18.00-18.50; No. 1 composition red brass, 17.00-17.25; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	50.00b	54.86c	....	58.32
Yellow Brass	50.57	36.06d	50.86	54.23
Low Brass, 80%	53.53	53.22	53.82	57.09
Red Brass, 85%	54.58	54.27	54.87	58.14
Com. Bronze, 90%	56.17	55.86	56.46	59.48
Manganese Bronze	58.86	52.21	62.69	....
Muntz Metal	53.20	48.26	....	....
Naval Brass	55.12	48.68	61.43	58.78
Silicon Bronze	62.86	61.80	62.15	80.79
Nickel Silver, 10%	65.98	68.06	68.06	....
Phos. Bronze	77.44	78.19	77.69	79.37

SCRAP ALLOWANCES e (Based on copper at 30.00c)

	Heavy	Rod Ends	Clean Turnings
Copper	29.000	29.000	28.250
Yellow Brass	22.250	21.250	20.250
Low Brass, 80%	24.750	24.500	24.000
Red Brass, 85%	25.750	25.500	25.000
Com. Bronze, 90%	26.750	26.500	26.000
Manganese Bronze	20.875	26.625	19.875
Muntz Metal	20.875	20.625	20.125
Naval Brass	20.750	20.500	20.000
Silicon Bronze	28.375	28.125	27.375
Nickel Silver, 10%	26.875	26.625	14.937
Phos. Bronze	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-15.75; new brass clippings, 14.00-14.50; light brass, 10.50-10.75; heavy yellow brass, 11.50-11.75; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 12.50-12.75; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 24.00-25.00; old sheets, 22.00-23.00; turnings, 19.00-20.00; rods, 24.00-25.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.00-2.25.

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 6.50-7.00; segregated low copper clips, 14.00-14.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 8.00-8.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.75-15.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 26.75; No. 2 heavy copper and wire, 23.75; light copper, 21.50; refinery brass (60% copper) dry copper content, 22.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.75; No. 2 heavy copper and wire, 23.75; light copper, 21.50; No. 1 composition borings, 19.75; No. 1 composition solids, 20.25; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 16.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,0000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,-000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (Anhydrous): 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

Stannous Sulphate: Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 155)

heavy melting is quoted $26.50-$27.50. A week ago, the price of this grade fell $1 a ton.

• **St. Louis**—The local scrap market is at a standstill. Few transactions have been reported the last week or so, and the tonnages moved have been small. Orders run 50 to 100 tons, instead of the normal 1000 tons. The outlook for an upswing in demand soon is not promising.

• **Birmingham**—Settlement of the long strike at two cast iron pipe foundries and the return to the market of soil pipe manufacturers at Anniston after long absences have spurred a general pickup in scrap purchases by foundries in the area. One broker reports he now has more orders on his books than at any time in the last two months. Open hearth and electric furnace operators, however, continue out of the market.

• **Houston**—The market is limping along; there is no significant mill demand in sight for June. Mill inventories are heavy, and steel operations are declining.

Early hopes that export demand would keep scrap moving have not been realized. It's reported that Japanese negotiations are being scheduled for 80 cargoes in the third quarter. An earlier report indicated 65 cargoes were involved.

Mexican demand is ebbing. The West Texas scrap collecting center of Eagle Pass slashed buying prices of heavy melting steel $2 a ton last week.

• **Seattle**—The market is steady at $35 for No. 1 heavy melting, $32 for No. 2 heavy melting, and $23 for No. 2 bundles. Prices seem a little firmer due to export interest.

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STEEL MILL ENGINEER. Graduate M.E., 18 years experience, Rolling Mills to Tin Plate, Coke Ovens, Blast Furnaces, Docks, Sintering. Five years with steel mill equipment manufacturer. Engineering administration, design, and installation. Write Box 855, STEEL, Penton Bldg., Cleveland 13, Ohio.

MANAGER—Warehouse or sales, seven years in steel. Mill, warehouse and fabrication experience. College degree, age 35. Box 852, STEEL, Penton Bldg., Cleveland 13, Ohio.

MACHINE TOOL SALESMAN, carbide tools, abrasives and supply experience seeks challenging position with progressive organization. Reply Box 856, STEEL, Penton Bldg., Cleveland 13, Ohio.

IF YOU OPERATE A FURNACE . . . . .

We will purchase your scrap linings, retorts, conveyors, muffles, racks, etc. Any item made of Nickel alloy.

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If your plant has 20 tons or more metal turnings per month, this booklet will tell you how you can make a substantial yearly profit.

Metal turnings reduced to shoveling chips in an American Metal Turnings Crusher command $2 to $4 more per ton on the scrap market. In addition, you save 75% of storage space and recover 30-50 gallons more cutting oil per ton of turnings.

This booklet shows all models of American Metal Turnings Crushers with capacities from 2 to 50 TPH as well as installations showing conveyor systems, crushers and chip wringers.

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American PULVERIZER COMPANY
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS
1539 MACKLIND AVE. ST. LOUIS 10, MO.

Dealers think a slight advance may be experienced this month.

A recently organized export house has leased Port of Seattle terminals and is assembling a cargo for shipment to Japan. Third quarter prices the Japanese buyers will pay have not yet been indicated.

Exports are generally predicated on 40 per cent No. 1 steel, 40 per cent No. 2 steel, and 20 per cent No. 2 bundles. Trans-Pacific tramp steamers are readily available for full cargoes at $75,000 to $80,000 per voyage, free load and discharge, for an average of 9200 tons of cargo each.

• **Los Angeles**—Scrap demand has been slow since February, and prospects for a pickup over the coming weeks are only fair. Sales are considerably below where they were at this time a year ago.

• **San Francisco**—Three boatloads of steel scrap left the San Francisco Bay area last month for Japan, and more cargoes are scheduled to be moved this month. Aside from export activity, the movement is slow in this market.

Tubular Goods . . .

Tubular Goods Prices, Page 149

Sluggish demand for tubular goods is reflected in a steady slackening of operations at the pipe mills. Last week, Youngstown Sheet & Tube Co. shut down its Brier Hill Works for a week, suspending operations at three open hearths partly because of poor pipe business. The company's seamless mills continue in operation; they are supplied with tube rounds from Brier Hill's steel department.

Oil well drilling accelerated during the week ended May 23. Hughes Tool Co. reported 1895 rotary rigs at work, up 83 from the week before. While activity has moved ahead in recent weeks, the level of operation is still far behind that of a year ago. For the comparable week last year, Hughes counted 2197 rigs in operation.

Substantial gains in Kansas and Oklahoma pushed the May 23 total upward. Canadian drilling gained for the fourth straight week, moving up to 131 rigs vs. 87 at the beginning of May.

Advertising Index

Adams, R. P., Co., Inc. 128
Air Products, Inc. 39
Ajax Magnethermic Corporation 125
Allegheny Ludlum Steel Corporation 90
Allen Manufacturing Co. 118
Allied Oil Co., Division of Ashland Oil & Refining Co. 81
Aluminium Limited Sales, Inc. 47
Aluminum Foils, Inc. 87
American Brass Co., The 121
American Gas Association 12
American Messer Corporation 75
American Pulverizer Co. 162
American Smelting & Refining Co., Federated Metals Division 79
American Welding & Mfg. Co., The 42
Armco Steel Corporation 50, 51
Ashland Oil & Refining Co., Allied Oil Co. Division 81
Atlas Car & Mfg. Co. 10

Baldwin-Lima-Hamilton, Industrial Equipment Division 72
Baldwin-Lima-Hamilton, Standard Steel Works Division 127
Basic Products Corporation, Hevi-Duty Electric Co. Division 35
Behr-Manning Co., A Division of Norton Co. 150
Bellows Co., The, Division of International Basic Economy Corporation 4
Bethlehem Steel Co. 1, 17, 18, 19, 20
Birdsboro Corporation 31
Buffalo Forge Co. 3
Bullard Co., The 68
Butler Manufacturing Co. 140

Carlson, G. O., Inc. 105
Carpenter Steel Co., The 26, 27
Cattie, Joseph P., & Brothers, Inc. 154
Central Foundry Division, General Motors Corporation 14, 15
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 36
Clymer Associates, Inc. 74
Colorado Fuel & Iron Corporation, The 23
Columbia-Geneva Steel Division, United States Steel Corporation 84, 85
Cone Drive Gears, Division Michigan Tool Co. 83
Cooper Alloy Corporation 144
Cowles Tool Co. 91
Cutler-Hammer, Inc. ..... Back Cover

Detroit Steel Corporation 48
DoAll Co., The 129
Dow Chemical Co., The 112, 113, 114
Duraloy Co., The 88
Dykem Co., The 154
Dyson, Joseph, & Sons, Inc. 128

Eastman Kodak Co., X-ray Division 109
Eaton Manufacturing Co., Dynamatic Division 11
Electric Controller & Mfg. Division, Square D Co. ..... Inside Front Cover
Euclid Crane & Hoist Co., The 153
Ex-Cell-O Corporation 6
Ex-Cell-O Corporation, Machinery Division ... 7

Fairfield Manufacturing Co., Inc. 86
Federated Metals Division, American Smelting & Refining Co. 79
Fischer Special Mfg. Co. 126
Formed Tubes, Inc. 122

General American Transportation Corporation, Parker-Kalon Division 82
General Motors Corporation, Central Foundry Division 14, 15
General Steel Castings Corporation, National Roll & Foundry Division 29

Handy & Harman 164
Harco Corporation, The 153
Haynes Stellite Co., Division of Union Carbide Corporation 25
Hevi-Duty Electric Co., A Division of Basic Products Corporation 35
Homestead Valve Manufacturing Co., Hypressure Jenny Division 157
Hyde Park Foundry & Machine Co. 163

Industrial Equipment Division, Baldwin-Lima-Hamilton 72
Ingersoll-Rand 32, 33
Inland Steel Co. 52
International Basic Economy Corporation, Bellows-Valvair Divisions 4

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Refractories & Chemicals Division 92, 93
Kardong Brothers, Inc. 154

La Salle Steel Co. 13

Mathews Conveyer Co. 130
Metal & Thermit Corporation 96
Michigan Tool Co., Cone Drive Gears Division 83
Miller Electric Manufacturing Co., Inc. 137
Minneapolis-Honeywell 22
Moltrup Steel Products Co. 154
Morgan Construction Co. 61
Morse Twist Drill & Machine Co., A Division of Van Norman Industries, Inc. 110

National Machinery Co. 159
National Roll & Foundry Division, General Steel Castings Corporation 29
National Tube Division, United States Steel Corporation 84, 85
New Britain Machine Co., The, New Britain-Gridley Machine Division 37, 38
Nicholson File Co. 28
Northern Engineering Works 30
Norton Co., Behr-Manning Co. Division .. 150

Osborn Manufacturing Co., The 138

Pangborn Corporation ..... Inside Back Cover
Pannier Corporation, The 139
Parker-Kalon, A Division of General American Transportation Corporation 82
Philadelphia Gear Corporation 67

Republic Steel Corporation 8, 9
Revere Copper & Brass, Inc. 131
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 23
Royal McBee Corporation, Data Processing Division 62
Rust-Oleum Corporation 21
Ruthman Machinery Co., The 16

Seaway Steel Corporation 132
Simonds Abrasive Co., Division of Simonds Saw & Steel Co. 134
SKF Industries, Inc. 2
Somers Brass Co., Inc. 122
Square D Co., Electric Controller & Mfg. Division ..... Inside Front Cover
Standard Steel Works Division, Baldwin-Lima-Hamilton 127
Standard Tube Co., The 34
Sundstrand Corporation 89

Texaco, Inc. 95
Tinnerman Products, Inc. 76
Torrington Co., The 24
Torrington Co., The, Specialties Division 124
Townsend Co., Engineered Fasteners Division 94

Ulbrich Stainless Steels 141
Union Carbide Corporation, Haynes Stellite Division 25
Union Carbide Corporation, Union Carbide Metals Division 107
Union Carbide Metals Co., Division of Union Carbide Corporation 107
United States Steel Corporation, Subsidiaries 84, 85
United States Steel Export Co. 84, 85
United States Steel Supply Division, United States Steel Corporation 84, 85

Valvair Corporation, Division of International Basic Economy Corporation 4
Van Norman Industries, Inc., Morse Twist Drill & Machine Co. Division 110

Ward Steel Co. 74
Washington Steel Corporation 136
Wean Equipment Corporation 71
Weinstein Co. 161
Wheland Co., The 155

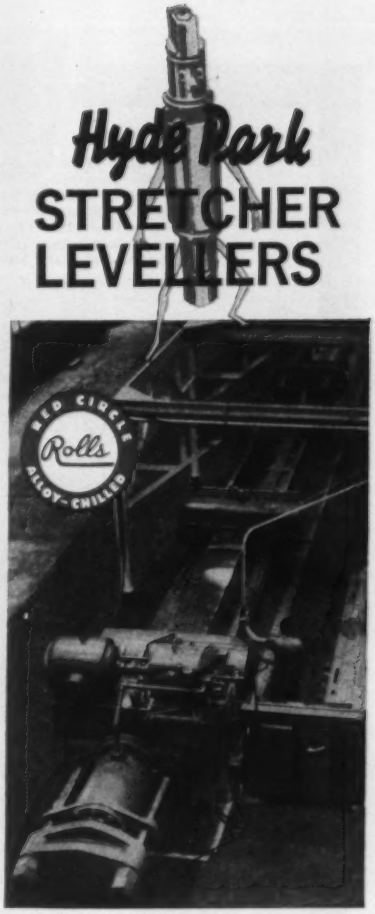
Youngstown Foundry & Machine Co., The .. 123
Youngstown Sheet & Tube Co., The 40, 41

~ ~ ~

Table of Contents

Facing Inside Front Cover

Classified Advertising, Page 161



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Adaptable for automatic cycling.

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Westmoreland County, Penna.

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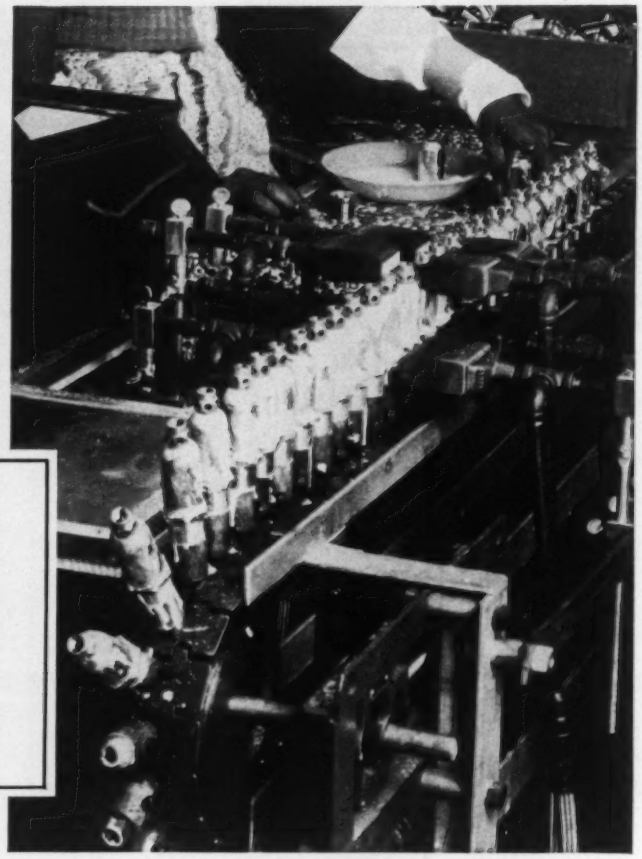
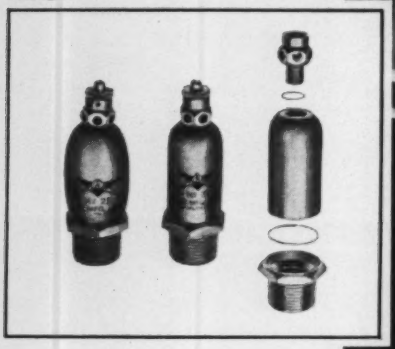


Operator dips parts in HANDY FLUX and assembles them with EASY-FLO 45 rings on a moving rig. Assemblies then pass between banks of gas burners to complete brazing process. Capillary action of EASY-FLO brazing alloy insures thorough penetration—guarantees high strength, leakproof joints.

Flair No. 21 Hot Water Air Vent consists of the basic free-venting air valve, a generous air-collection chamber and a massive hex base. Two preform rings of EASY-FLO 45 are used in the brazing operation. Valve assembly at left was subjected to extreme pressure. Note how body ballooned; joints strong and leaktight.



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Speed, strength, economy, low labor costs—advantages *any* manufacturer would be glad to have. And, all achieved through use of Handy & Harman silver alloy brazing. Chances are silver alloy brazing could benefit your product too. If it could, or if you think it *might*, don't hesitate to get in touch with Handy & Harman. We'll help you in every way possible. Why not call us today?

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OF HAGERSTOWN

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NEW *automated system for charging blast furnaces in steel mills*

NEW *stacker that counts and stacks newspapers automatically*

NEW *Safetybreaker line of service entrance equipment*

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